



# The Climate of Eastern Colorado

Nolan J. Doesken  
Colorado Climate Center

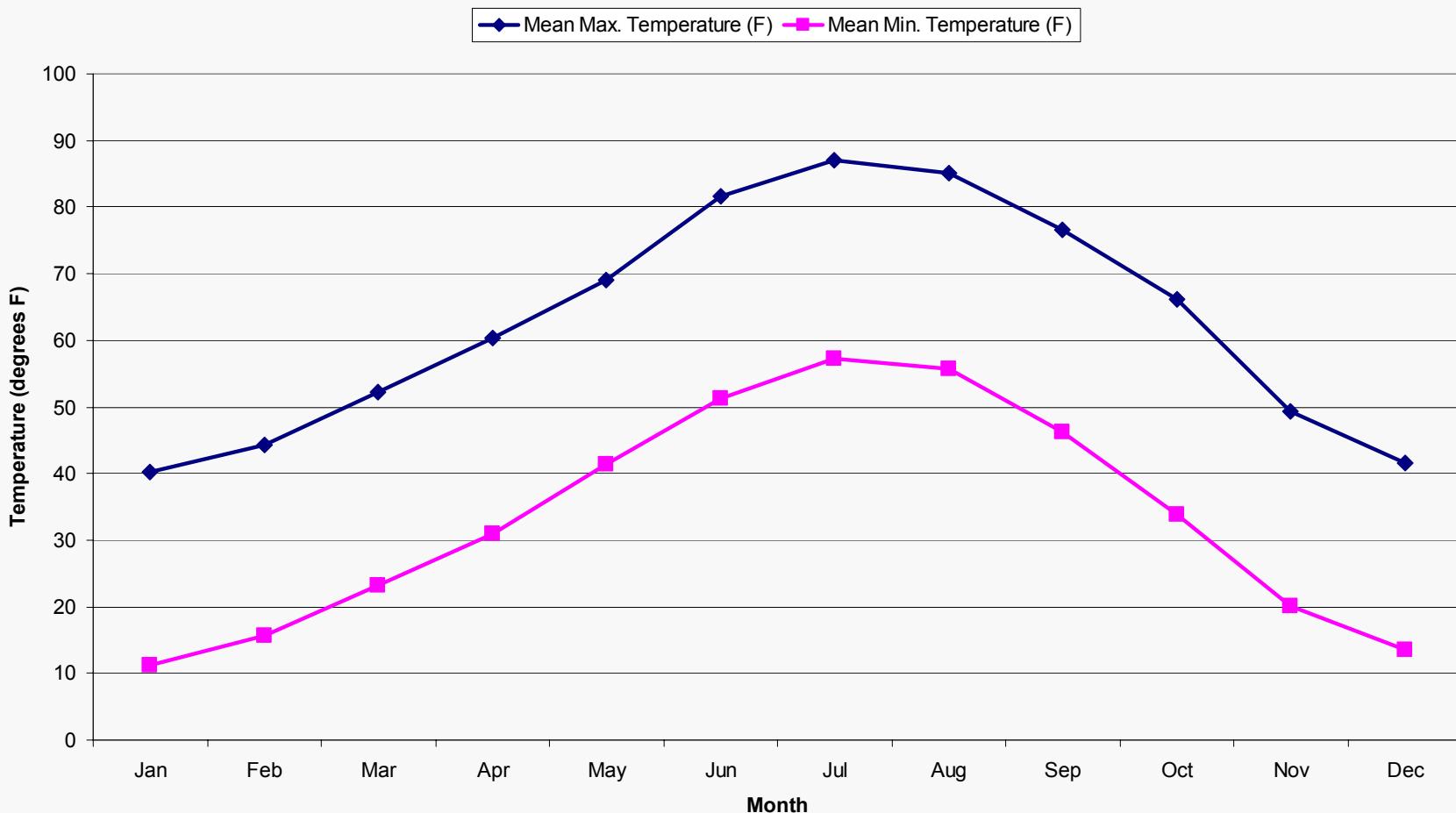
Presented to Flagler Conservation District,  
2005 Annual Meeting, January 20, 2005

Prepared by Odie Bliss



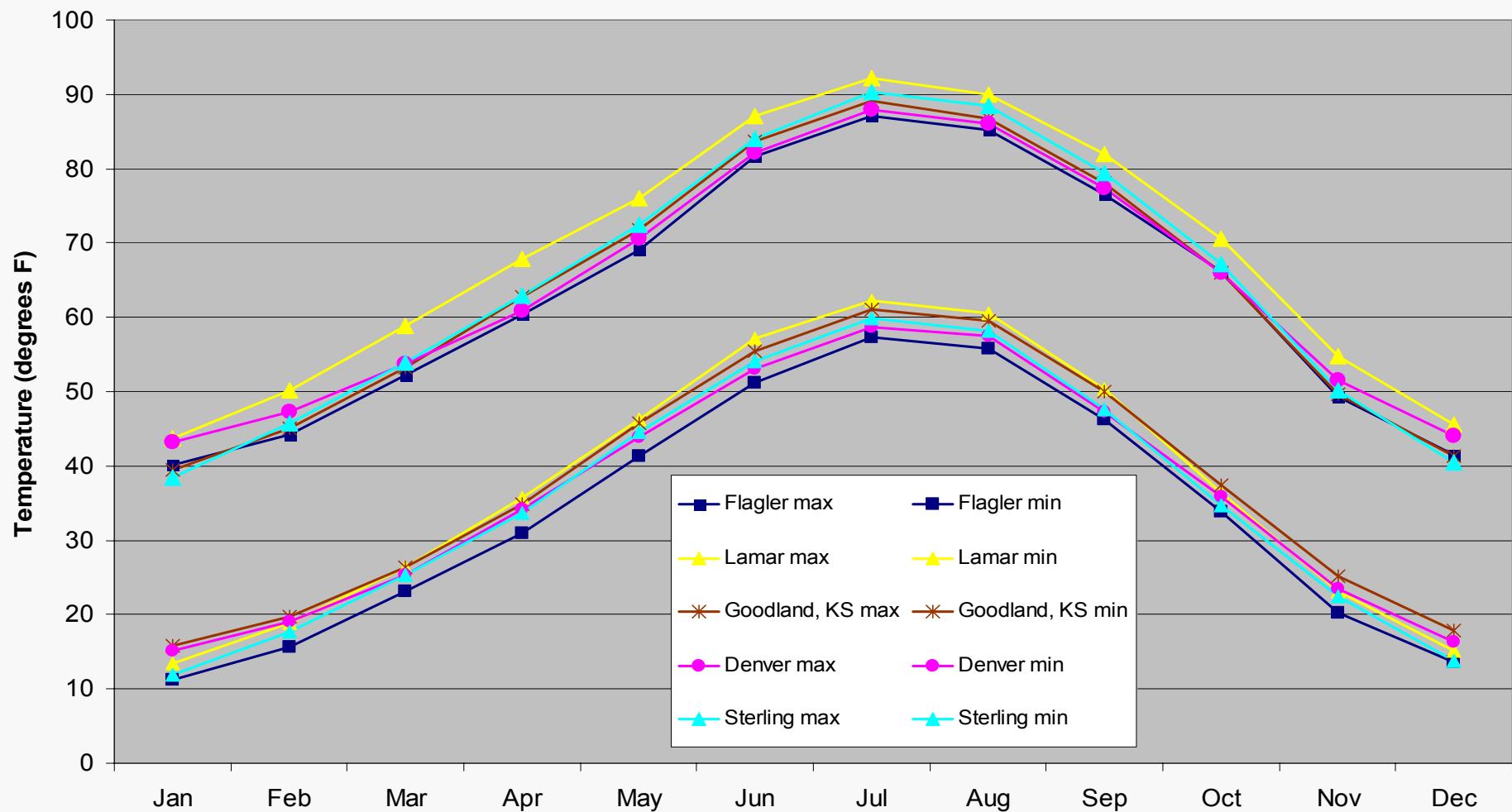
# Flagler Temperature Averages

Flagler Average Temperatures for the 1971-2000 period



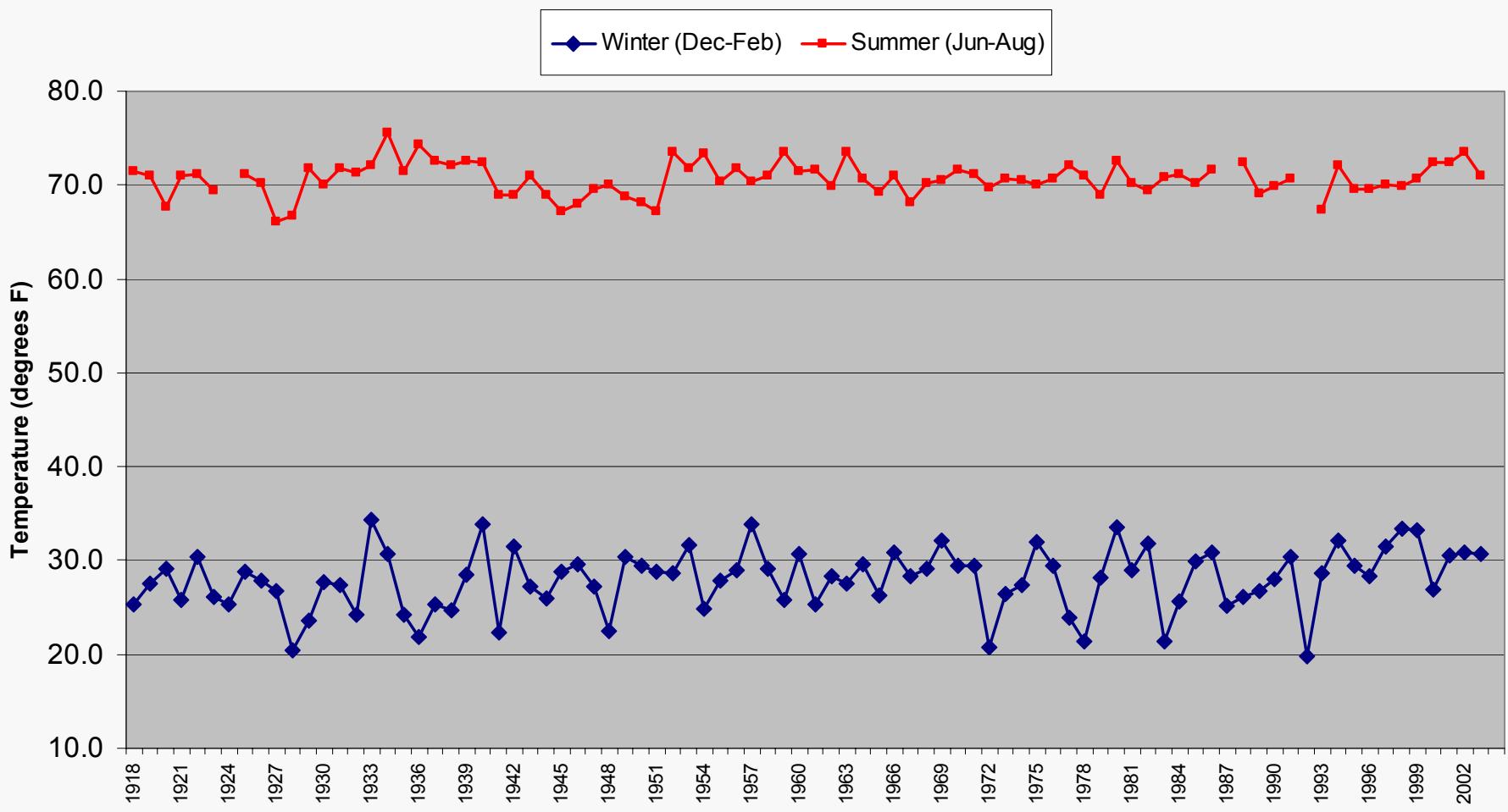
# Flagler Temperature Comparison With Surrounding Sites

Comparison of Flagler monthly average maximum and minimum temperatures  
with other surrounding cities for the 1971-2000 period

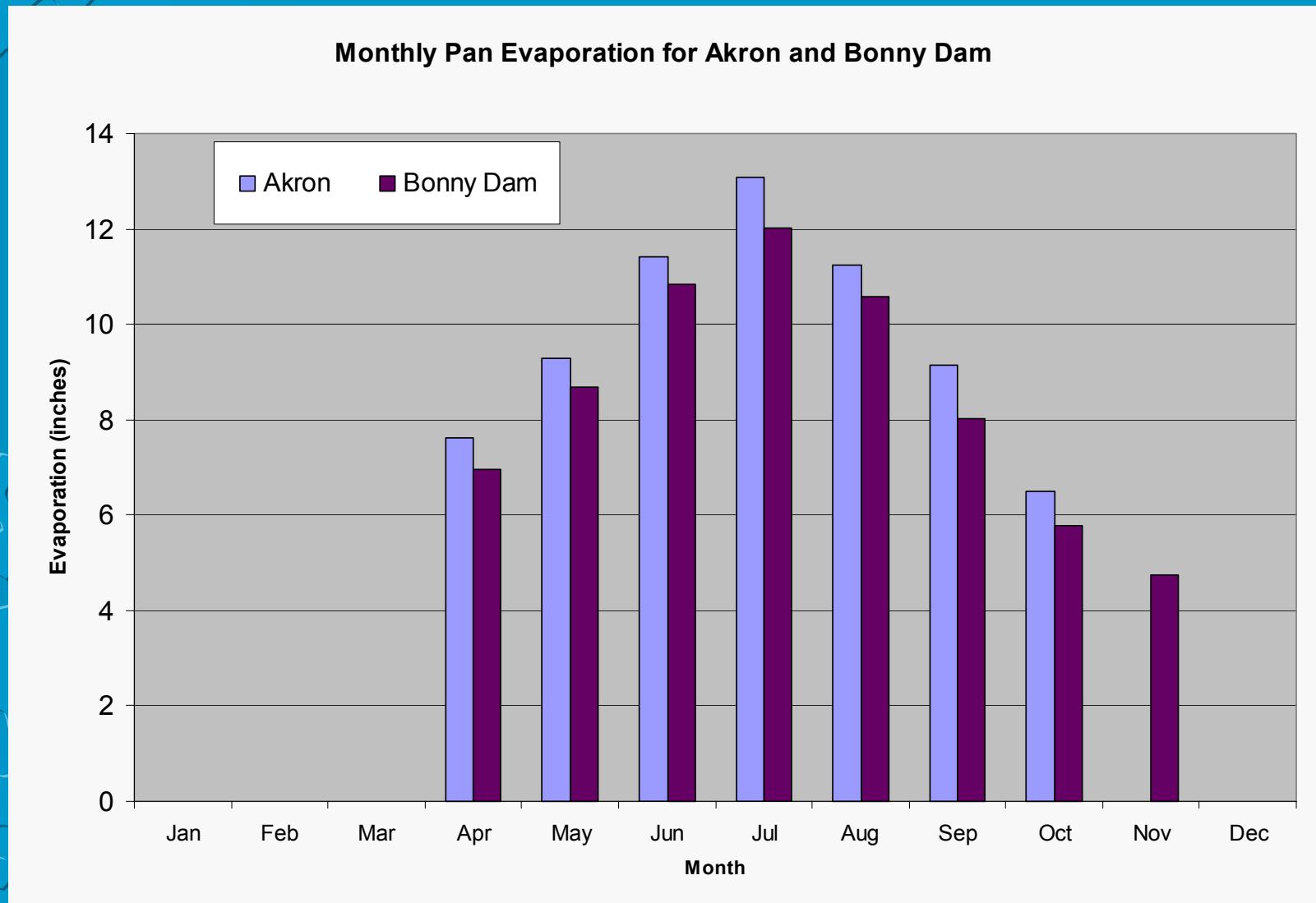


# Akron Average Winter and Summer Temperature Comparison

Akron Average Winter and Summer Temperatures

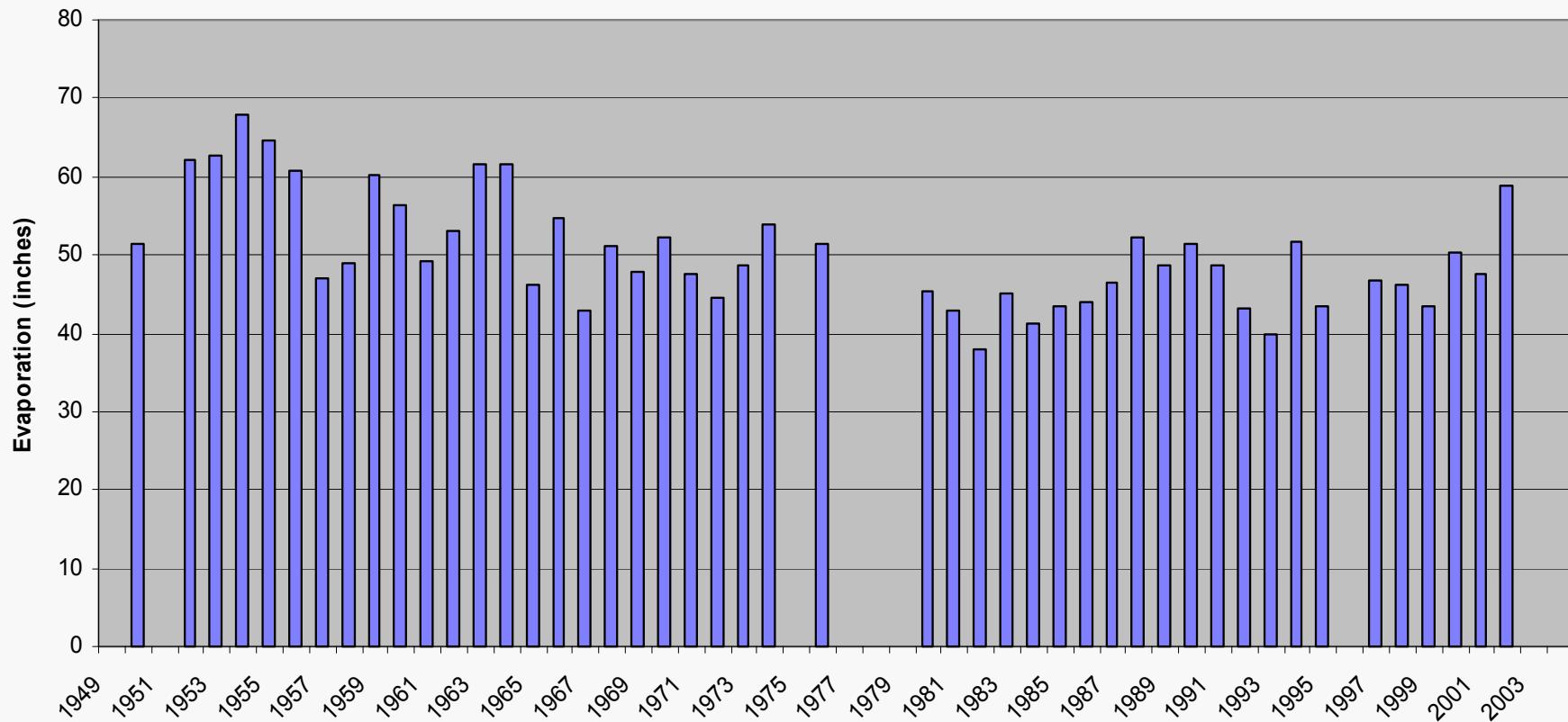


# Mean Monthly Pan Evaporation



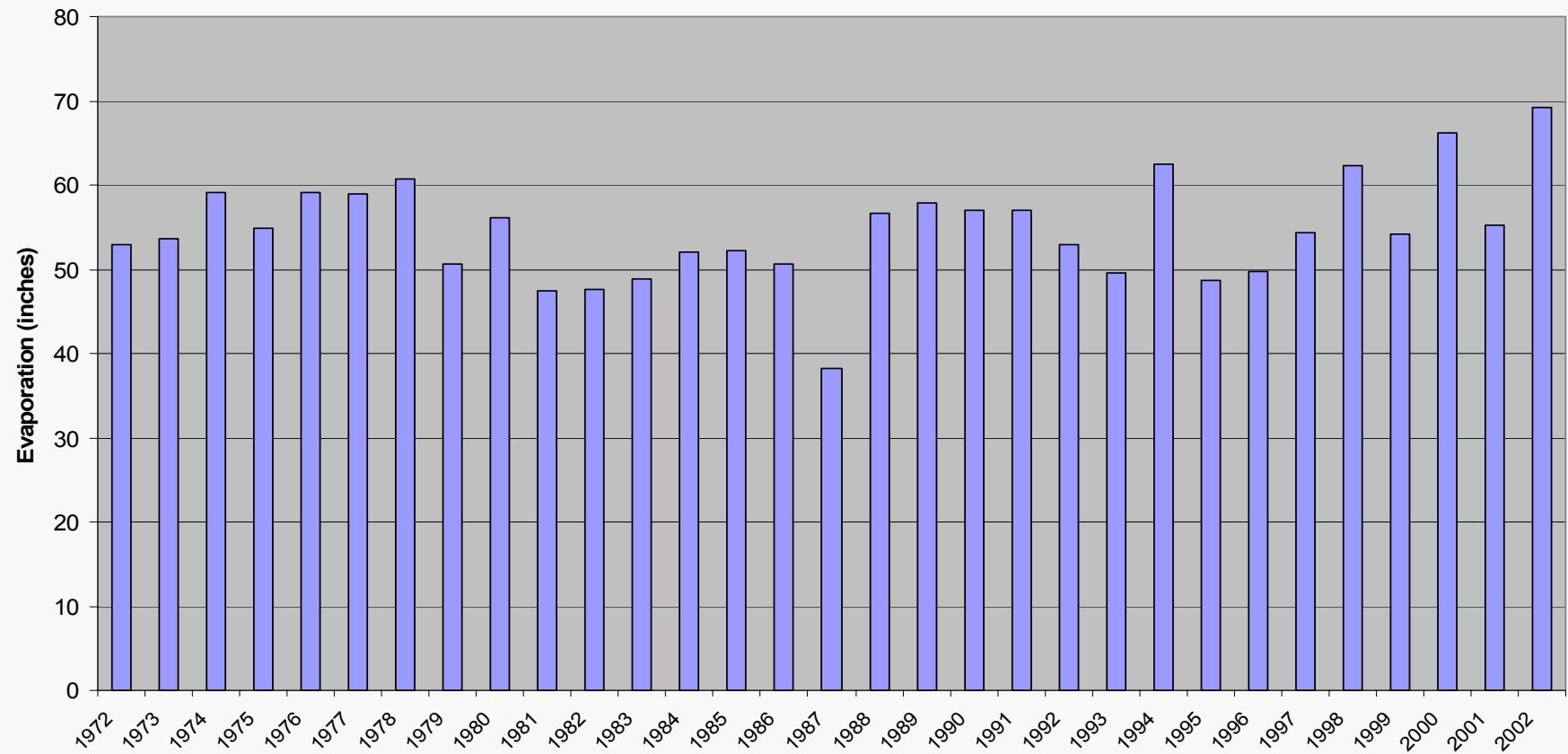
# Bonny Dam Pan Evaporation (May-Sep)

May - September Pan Evaporation for Bonny Dam

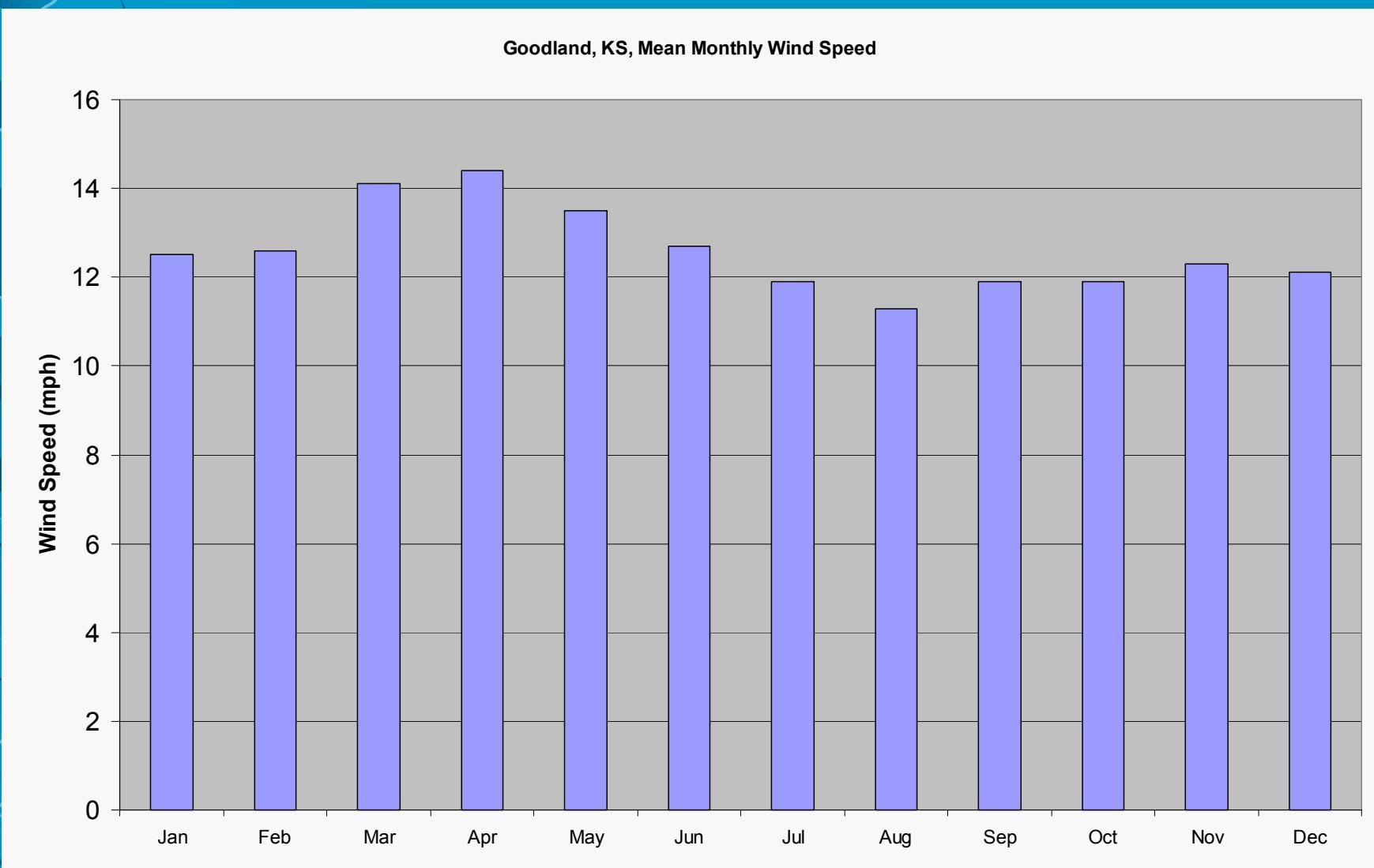


# Akron Pan Evaporation (May-Sep)

May-Sep Pan Evaporation for Akron 4E

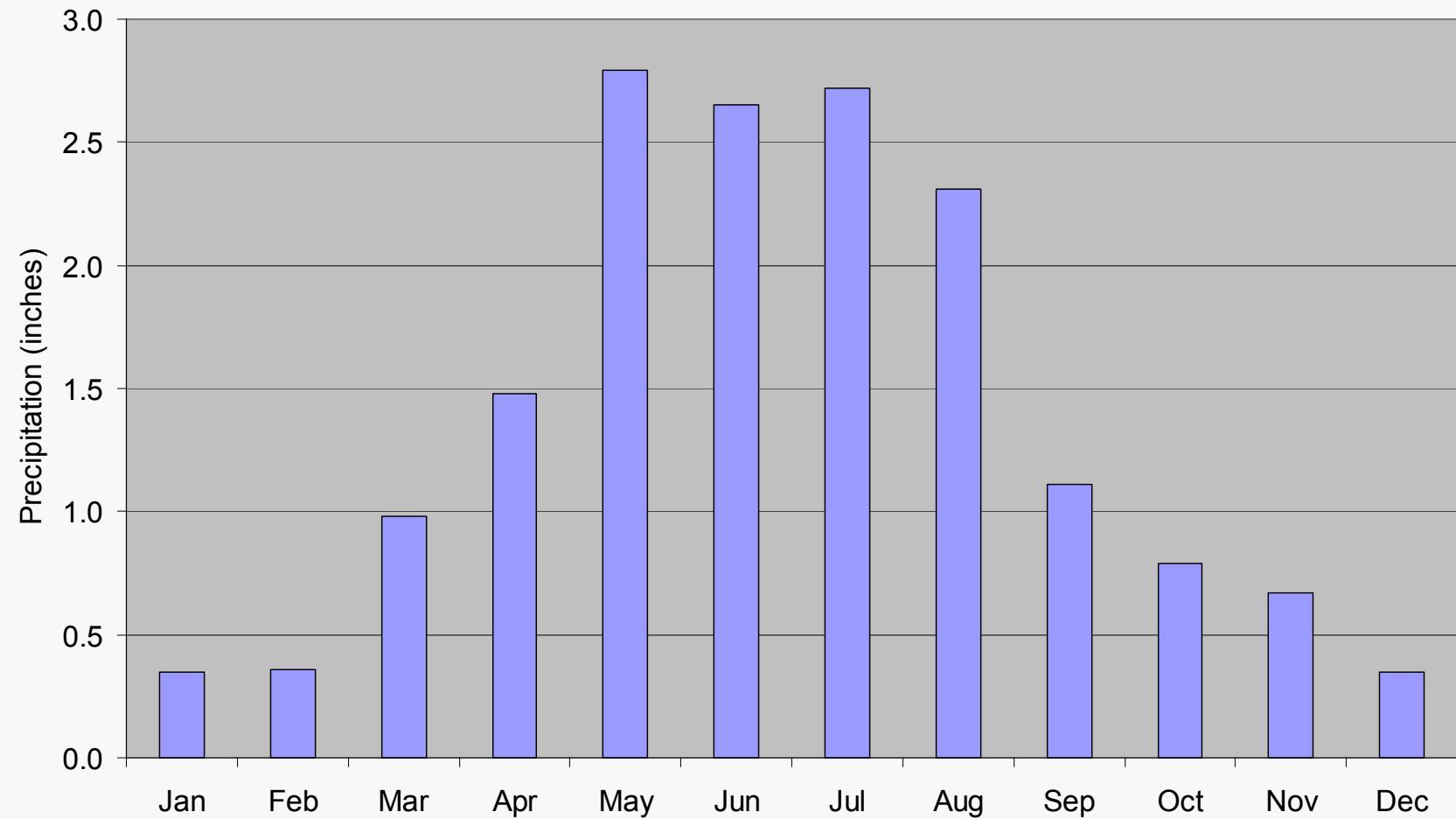


# Goodland, KS, Average Wind Speed

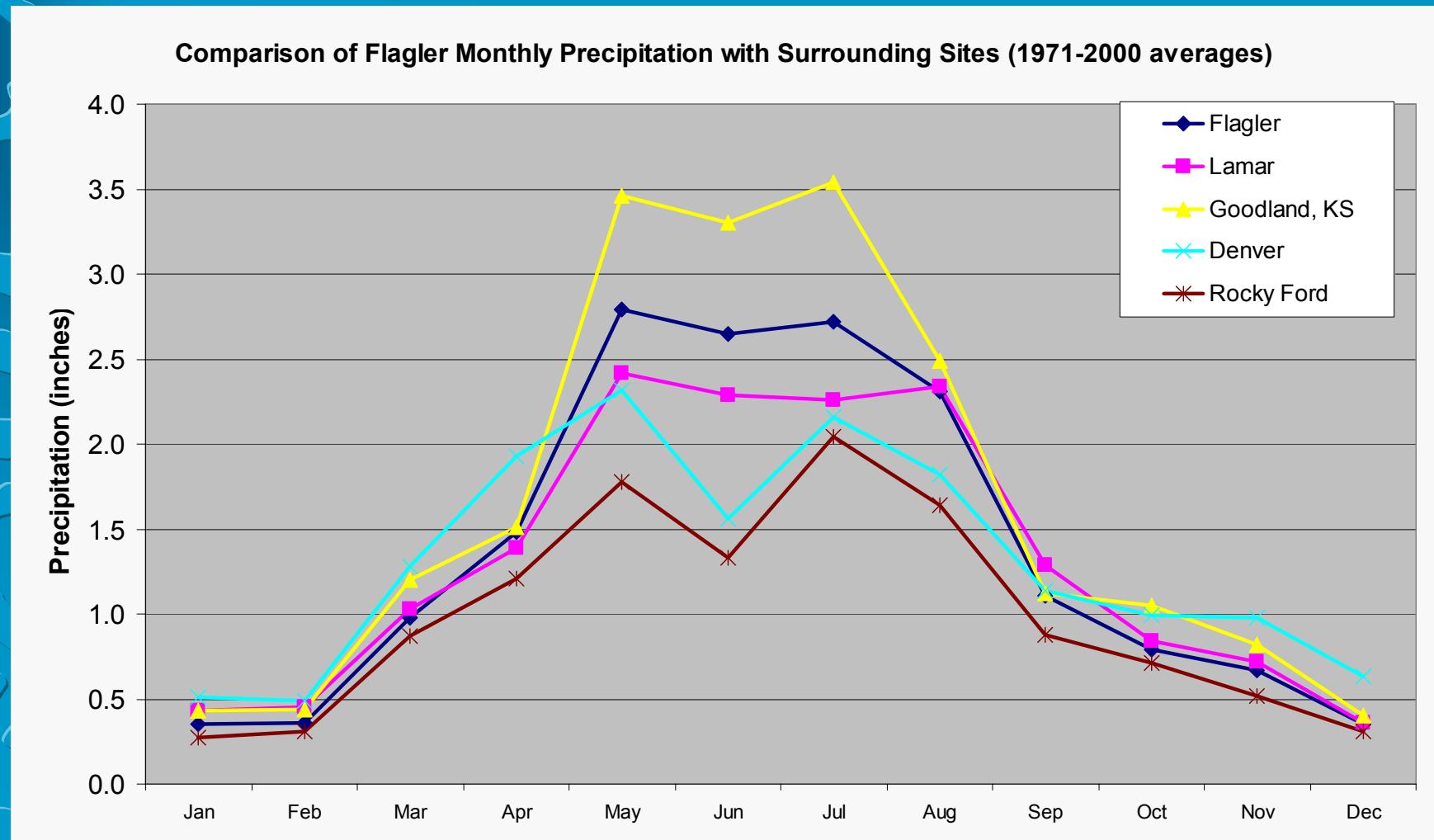


# Flagler Average Monthly Precipitation

Flagler Average Mean Precipitation (in.) for 1971-2000 averages

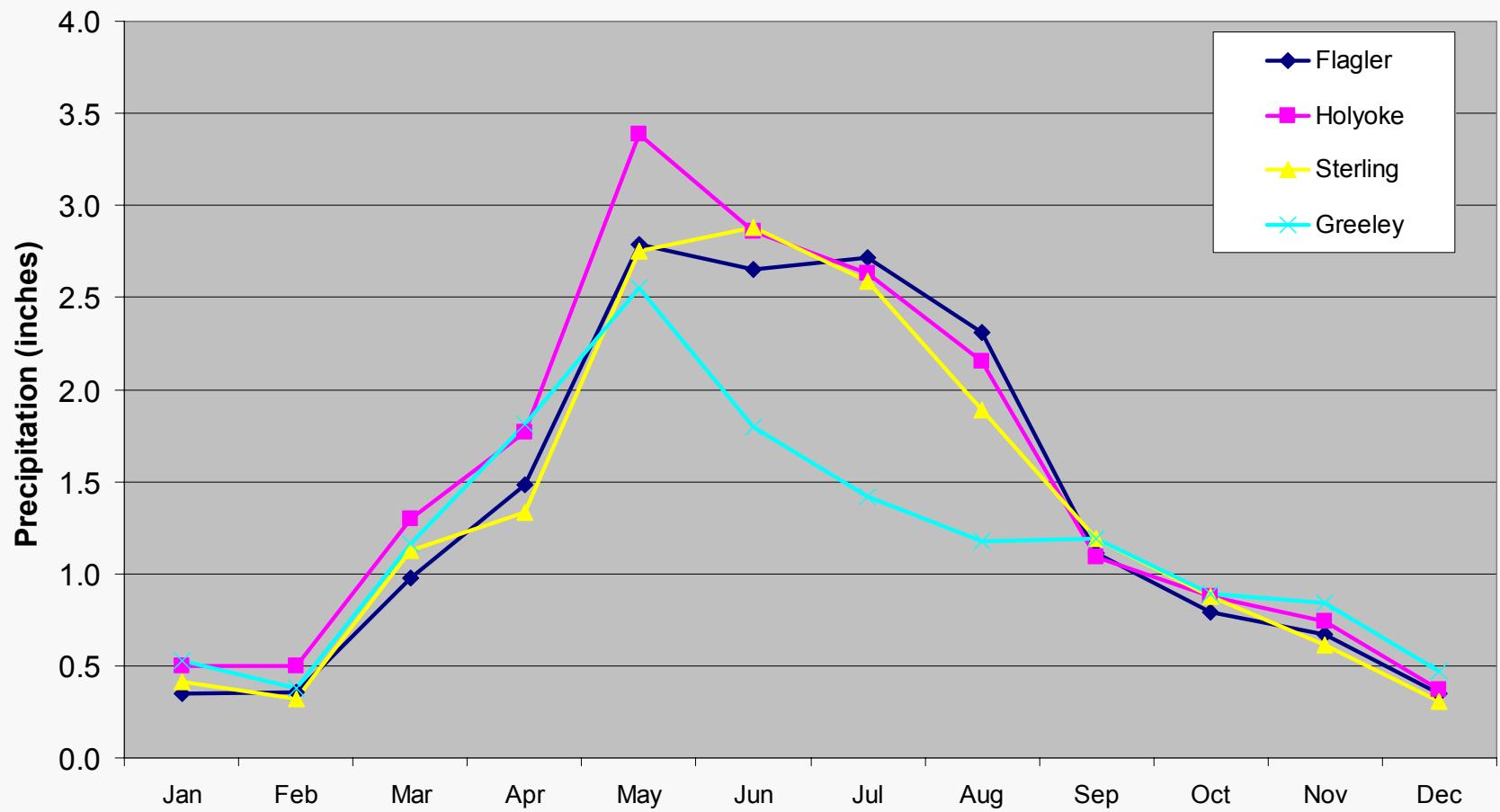


# Flagler Monthly Precipitation Compared to Surrounding Sites (1971-2000 averages)



# Flagler Average Precipitation Compared to Surrounding Sites

Flagler Average Precipitation Compared to Surrounding Sites (1971-2000 averages)

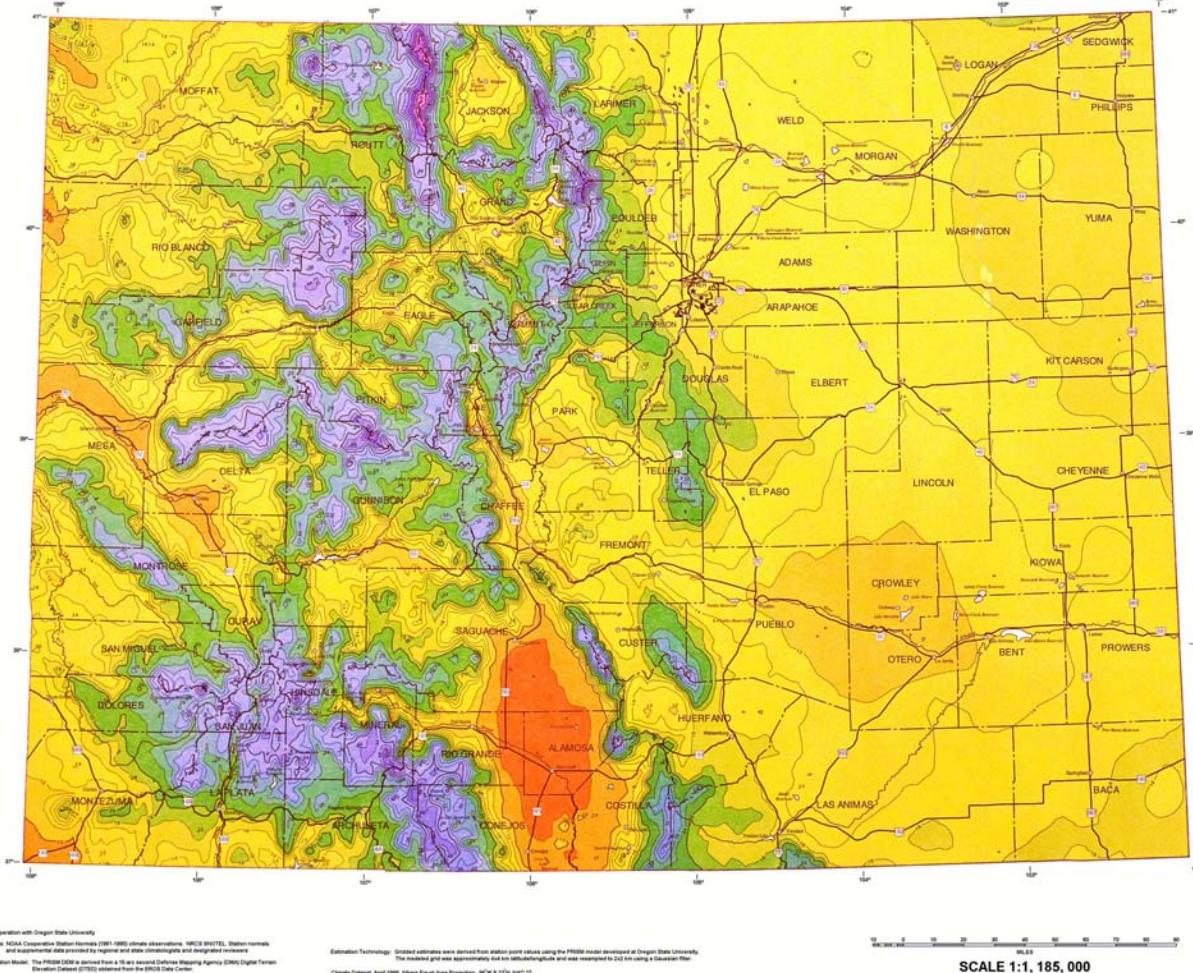


# Colorado Average Precipitation

U.S. DEPARTMENT OF AGRICULTURE

NATIONAL RESOURCES CONSERVATION SERVICE

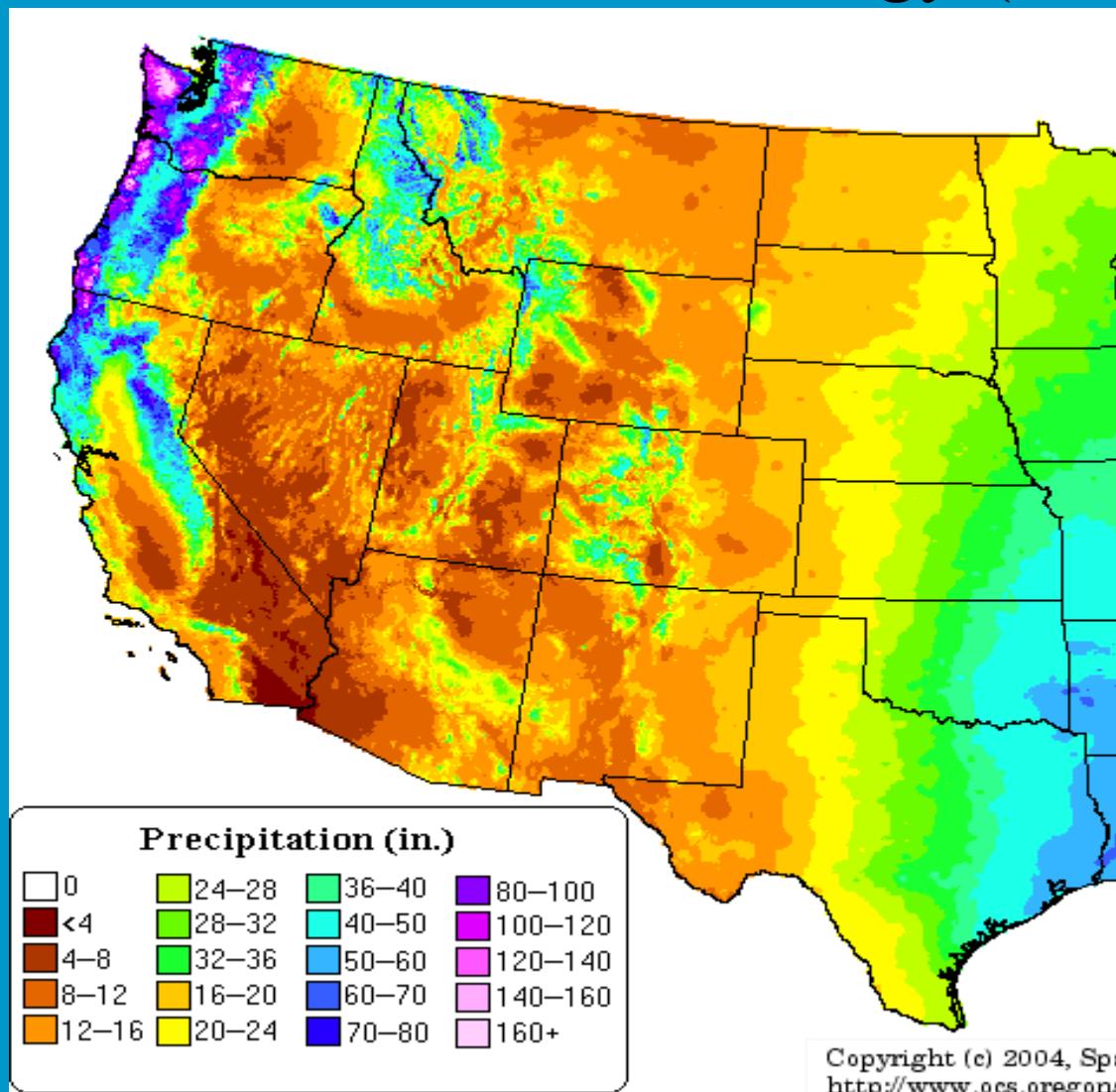
## COLORADO ANNUAL PRECIPITATION



SCALE 1:1,185,000

SOURCE NOTE  
Users are cautioned that contours may not exactly match station-observed precipitation especially in regions with significant precipitation gradients and/or short-term variability.  
April 1988, 102048

# Precipitation: Annual Climatology (1971-2000)

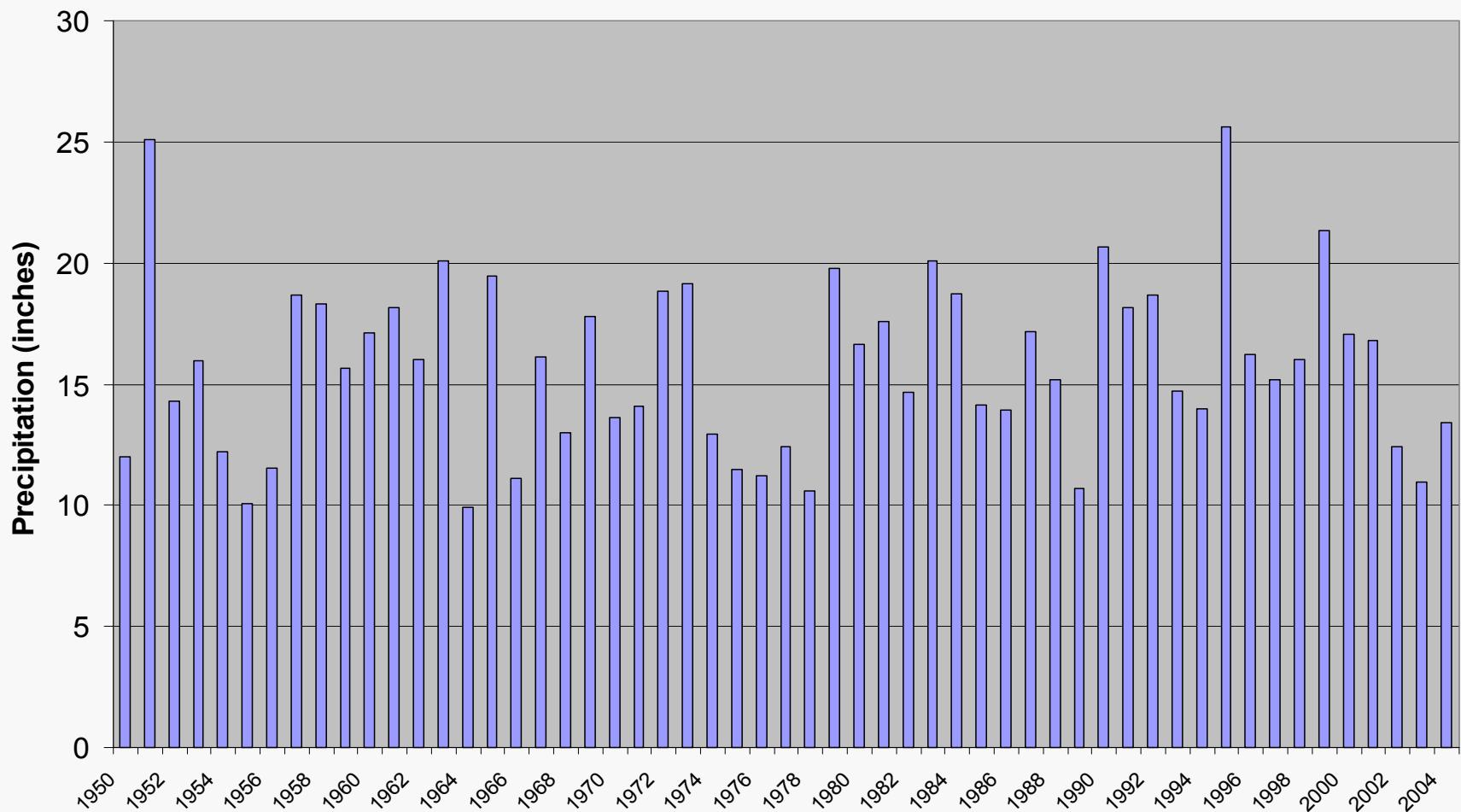


Copyright © 2004, Spatial Climate Analysis Service, Oregon State University  
<http://www.ocs.oregonstate.edu/prism> - Map created Feb 20 2004

# Flagler Annual Precipitation Totals

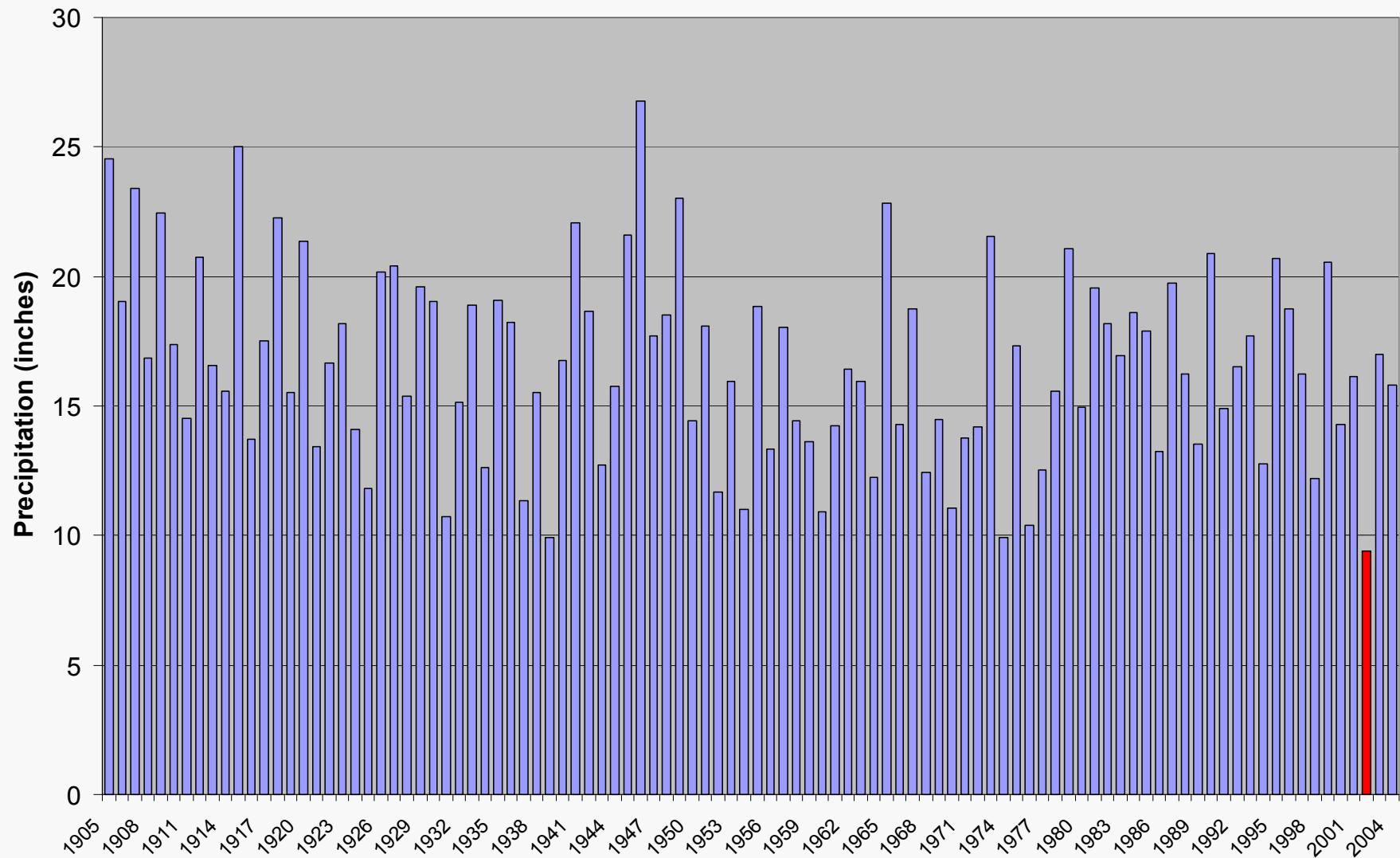
Incomplete records for some years

Flagler Total Annual Precipitation from 1950-2004



# Akron Annual Precipitation Totals

Akron Annual Precipitation from 1905-2004



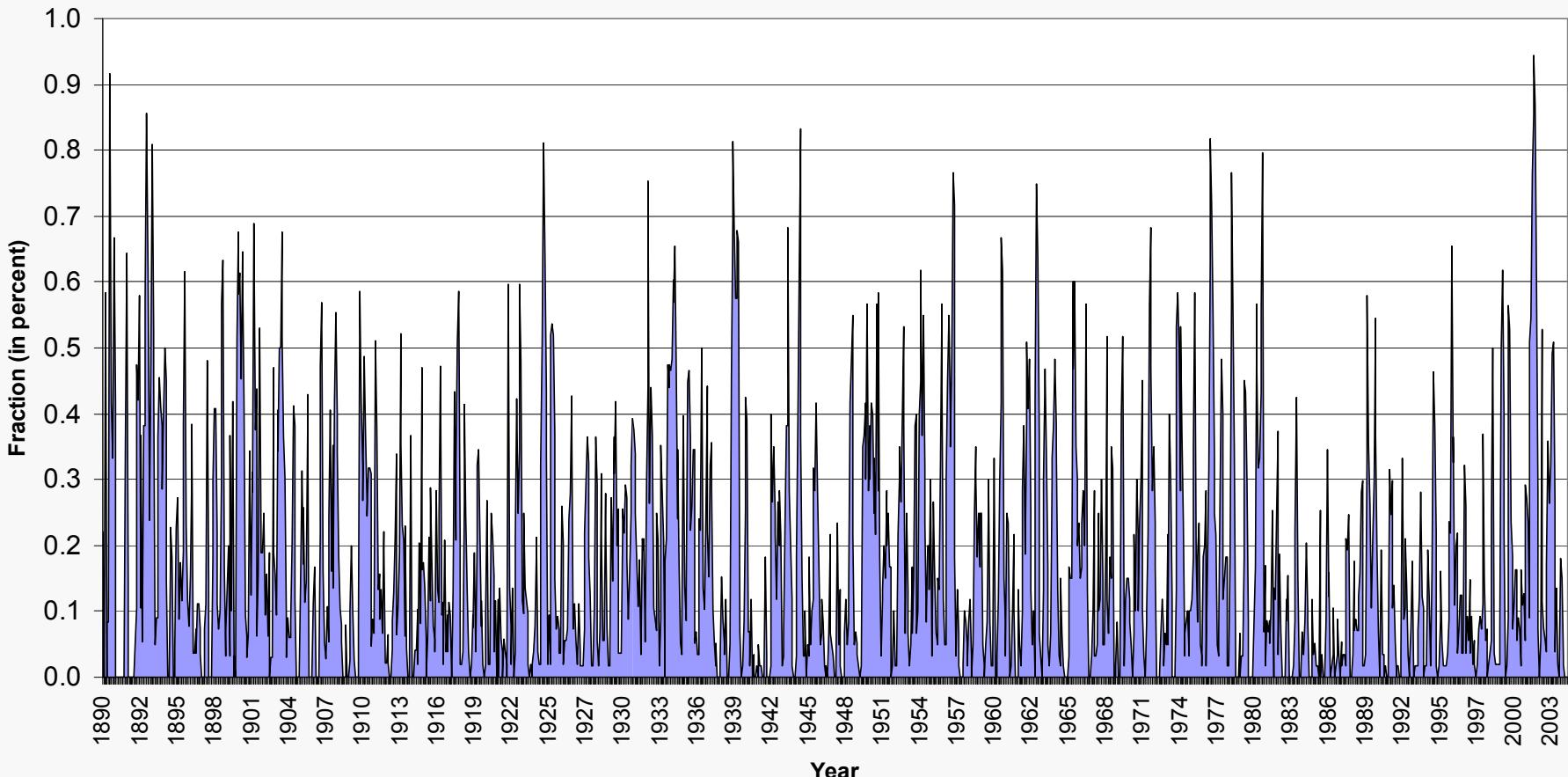
# What's the Status of the Drought Now??



# 3-Month SPI

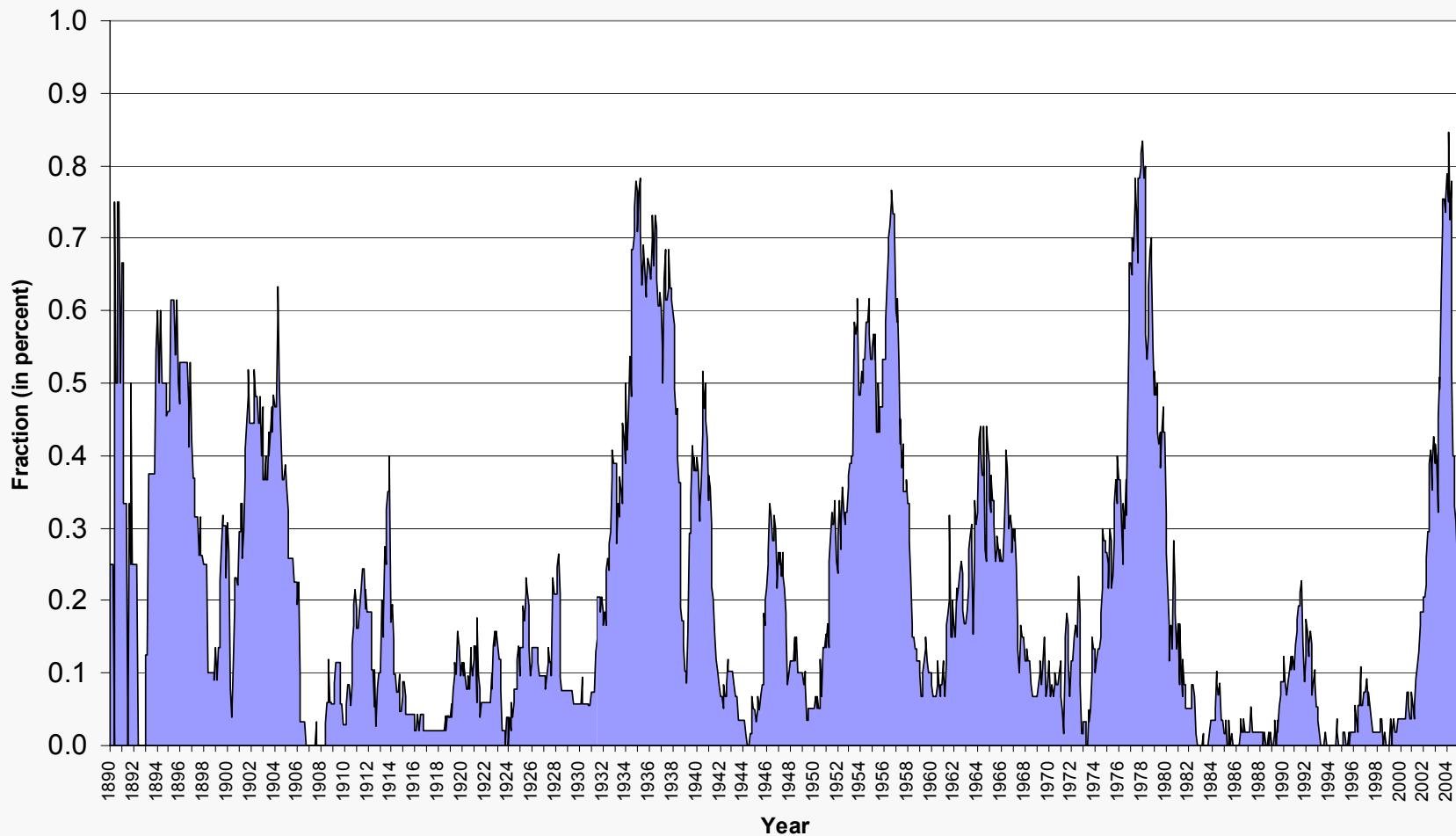
## Fraction of Colorado in Drought Based on 3 month SPI

(1890 - 2004)



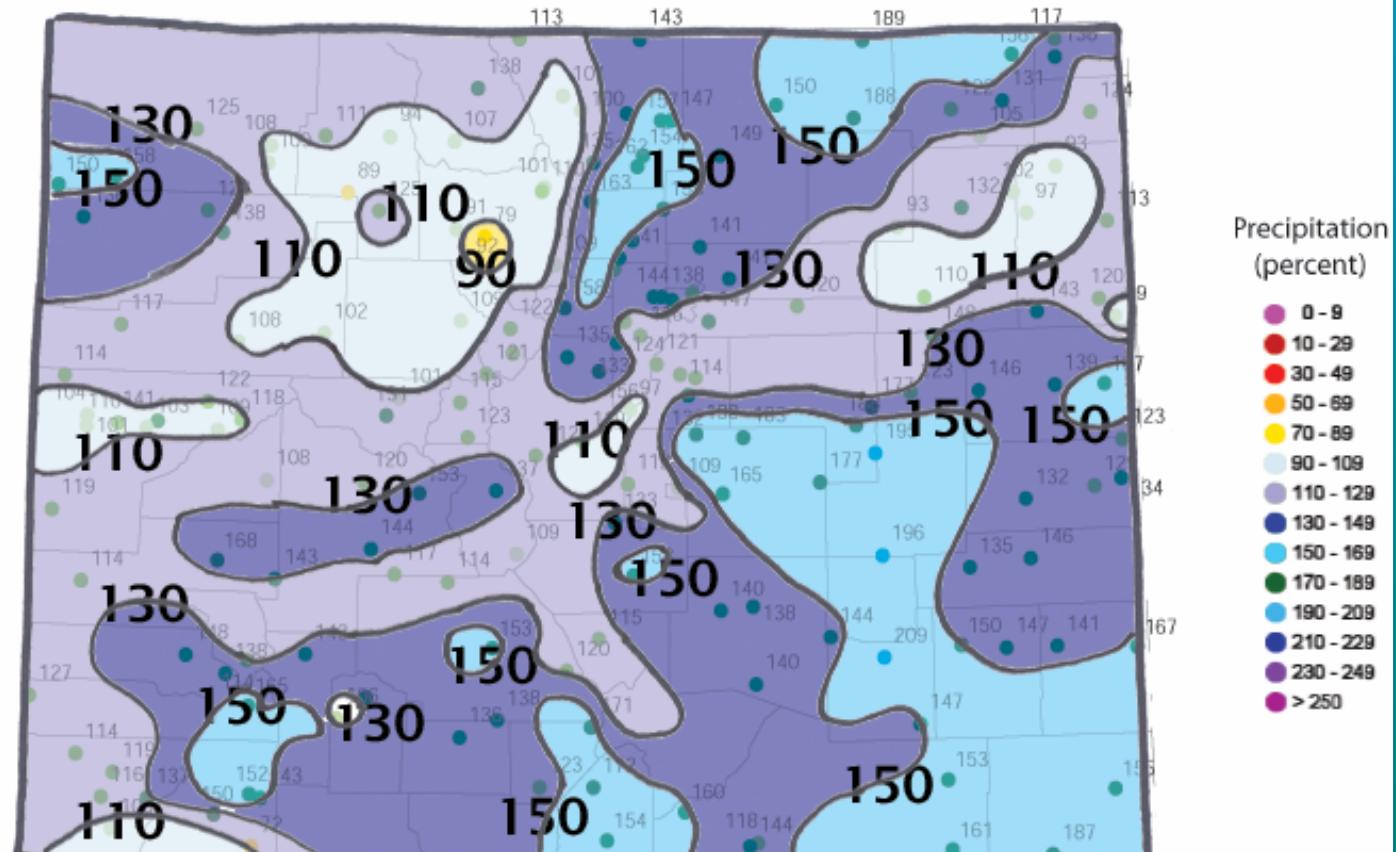
# 48-Month SPI

**Fraction of Colorado in Drought**  
Based on 48 month SPI  
(1890 - 2004)



# 1999 Water Year Precipitation

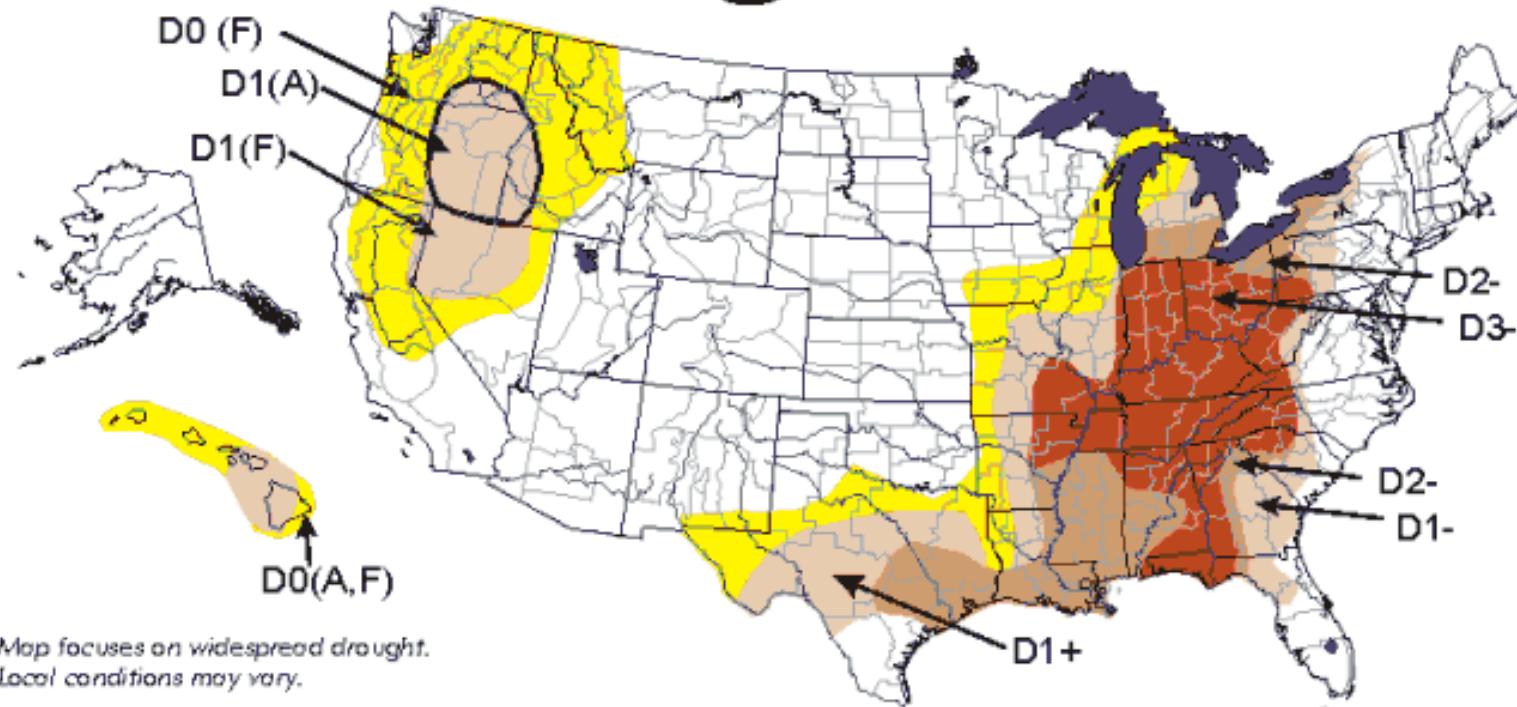
Water Year 1999  
(Oct. 1998-Sept. 1999)  
Precipitation Percent of Average for 1961-1990 Averages



# September 1999 Drought Monitor Map

September 28, 1999

## U.S. Drought Monitor



- Drought type: used only when impacts differ
- A = Agriculture  
W = Water  
F = Forest fire danger
- Plus (+) = Forecast to intensify next two weeks  
Minus (-) = Forecast to diminish next two weeks  
No sign = No change in drought classification forecast

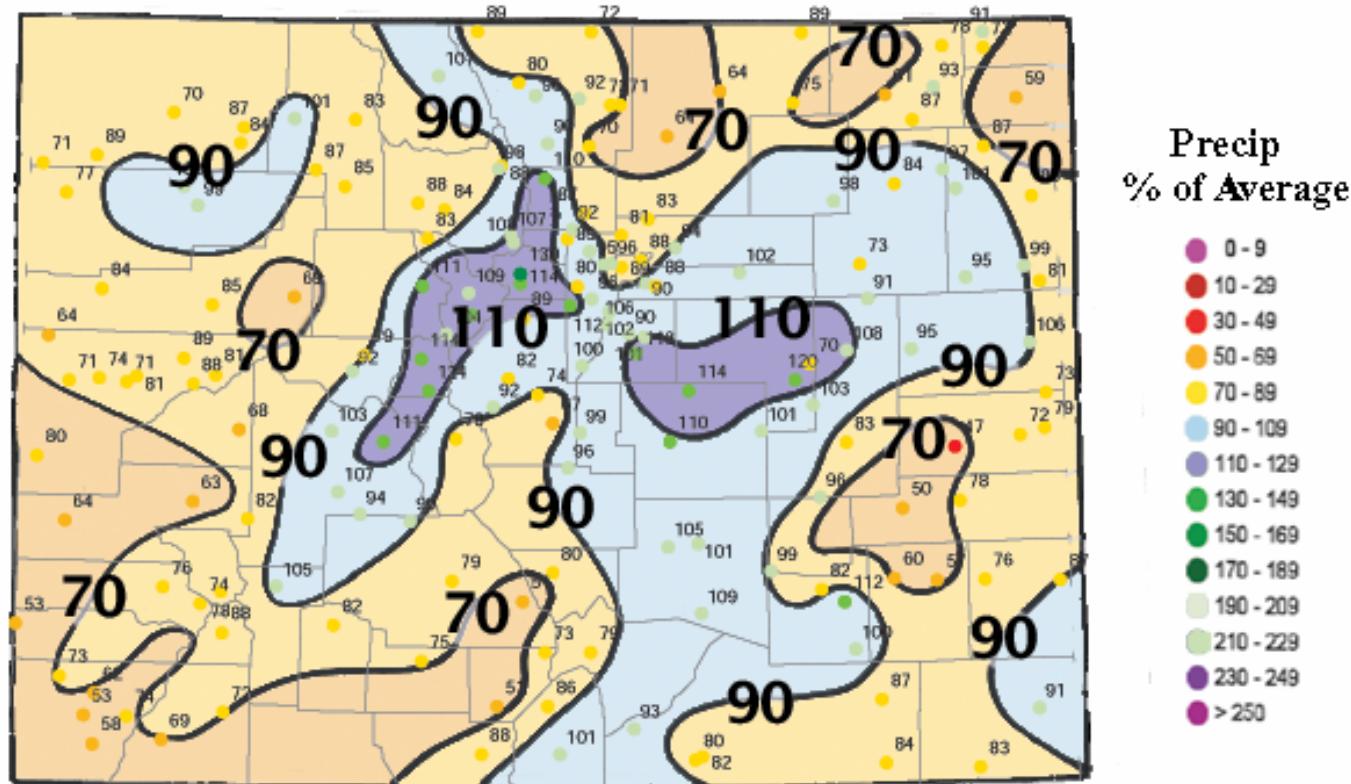


• Released Thursday, Sep 30, 1999 •

# 2000 Water Year Precipitation

Water Year 2000  
(Oct. 1999 - Sept. 2000)

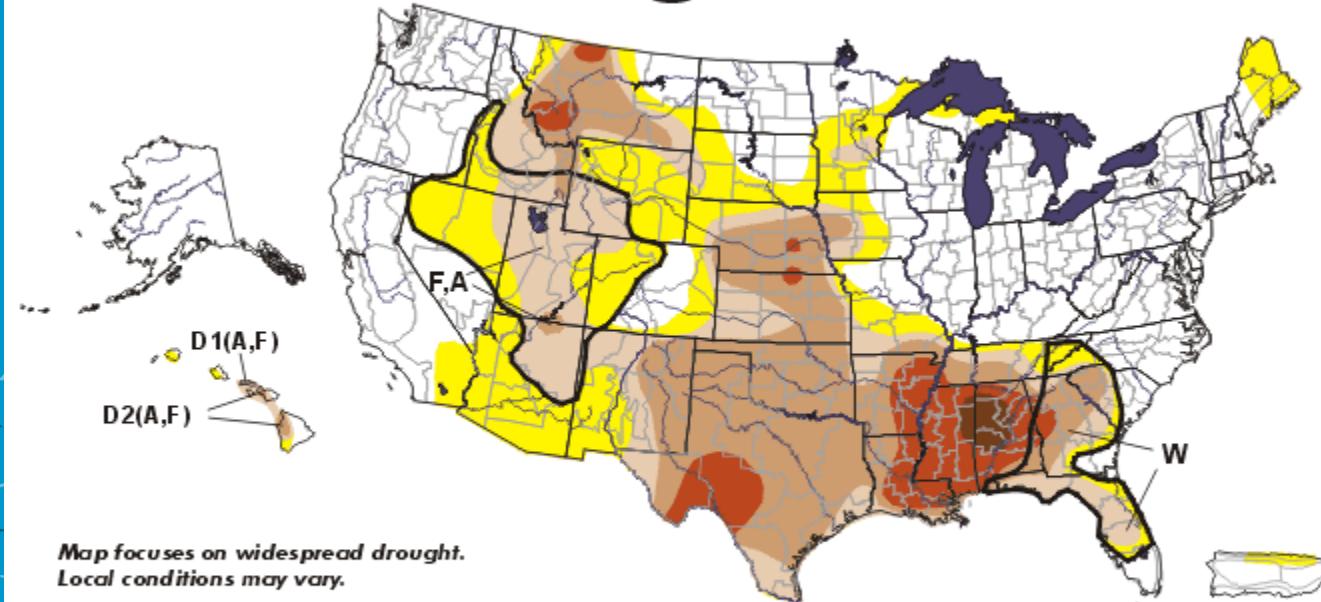
Precipitation Percent of Average for 1961-1990 Averages



# October 2000 Drought Monitor Map

October 3, 2000 Valid 8 a.m. EDT

## U.S. Drought Monitor



Map focuses on widespread drought.  
Local conditions may vary.

- D0 Abnormally Dry
- D1 Drought-First Stage
- D2 Drought-Severe
- D3 Drought-Extreme
- D4 Drought-Exceptional
- Delineates Overlapping Areas

- Drought type: used only when impacts differ
- A = Agriculture
  - W = Water
  - F = Wildfire danger

See accompanying texts summary for forecast statements  
<http://enso.unl.edu/monitor/monitor.html>

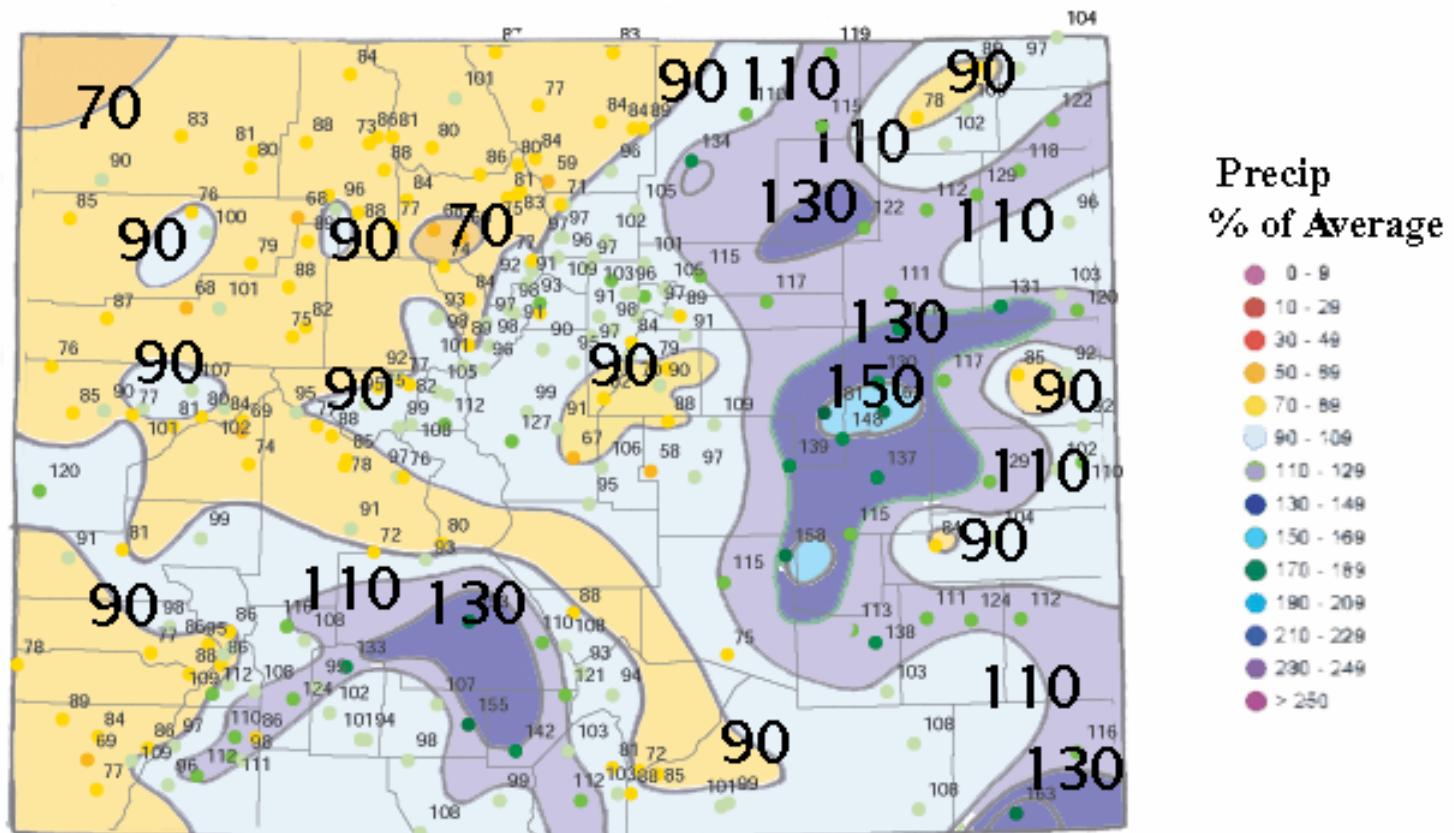


• Released Thursday, Oct. 5, 2000 •

# 2001 Water Year Precipitation

Water Year 2001  
(Oct. 2000 - Sept. 2001)

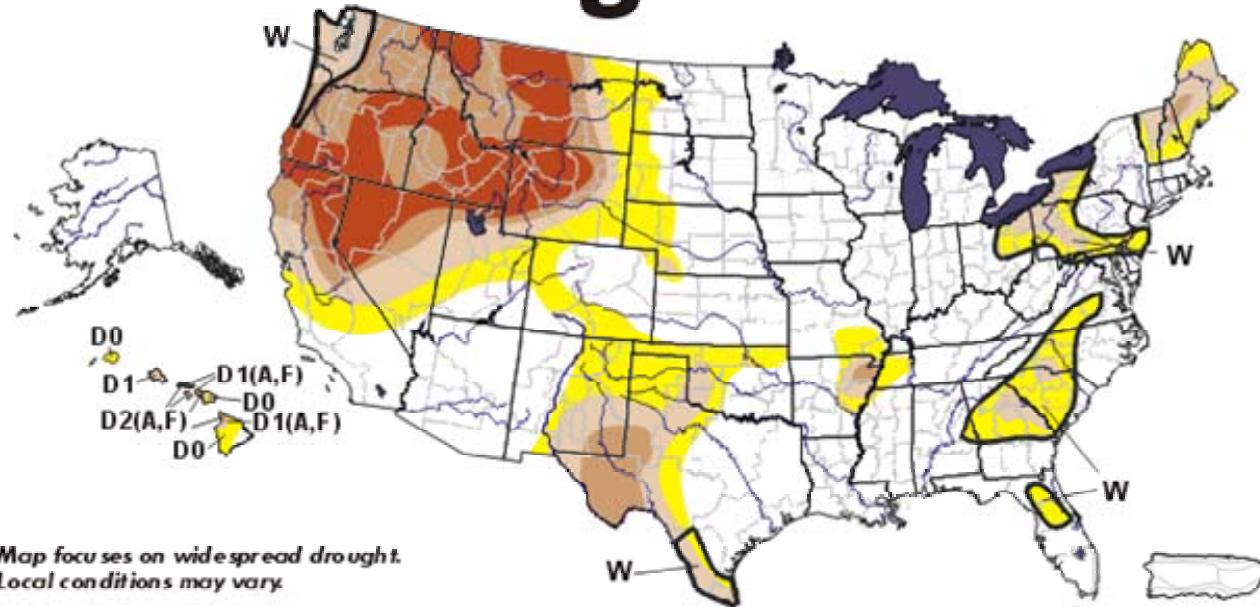
Precipitation Percent of Average for 1961-1990 Averages



# October 2001 Drought Monitor Map

October 2, 2001 Valid 8 a.m. EDT

## U.S. Drought Monitor

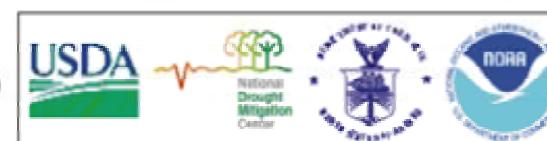


Map focuses on widespread drought.  
Local conditions may vary.

- D0 Abnormally Dry
- D1 Drought-Moderate
- D2 Drought-Severe
- D3 Drought-Extreme
- D4 Drought-Exceptional
- ✓ Delineates Overlapping Areas

- Drought Impact Types:  
A = Agriculture  
W = Water (Hydrological)  
F = Fire danger (Wildfires)  
(No type = All 3 impacts)

See accompanying text summary for forecast statements  
<http://enso.unl.edu/monitor/monitor.html>



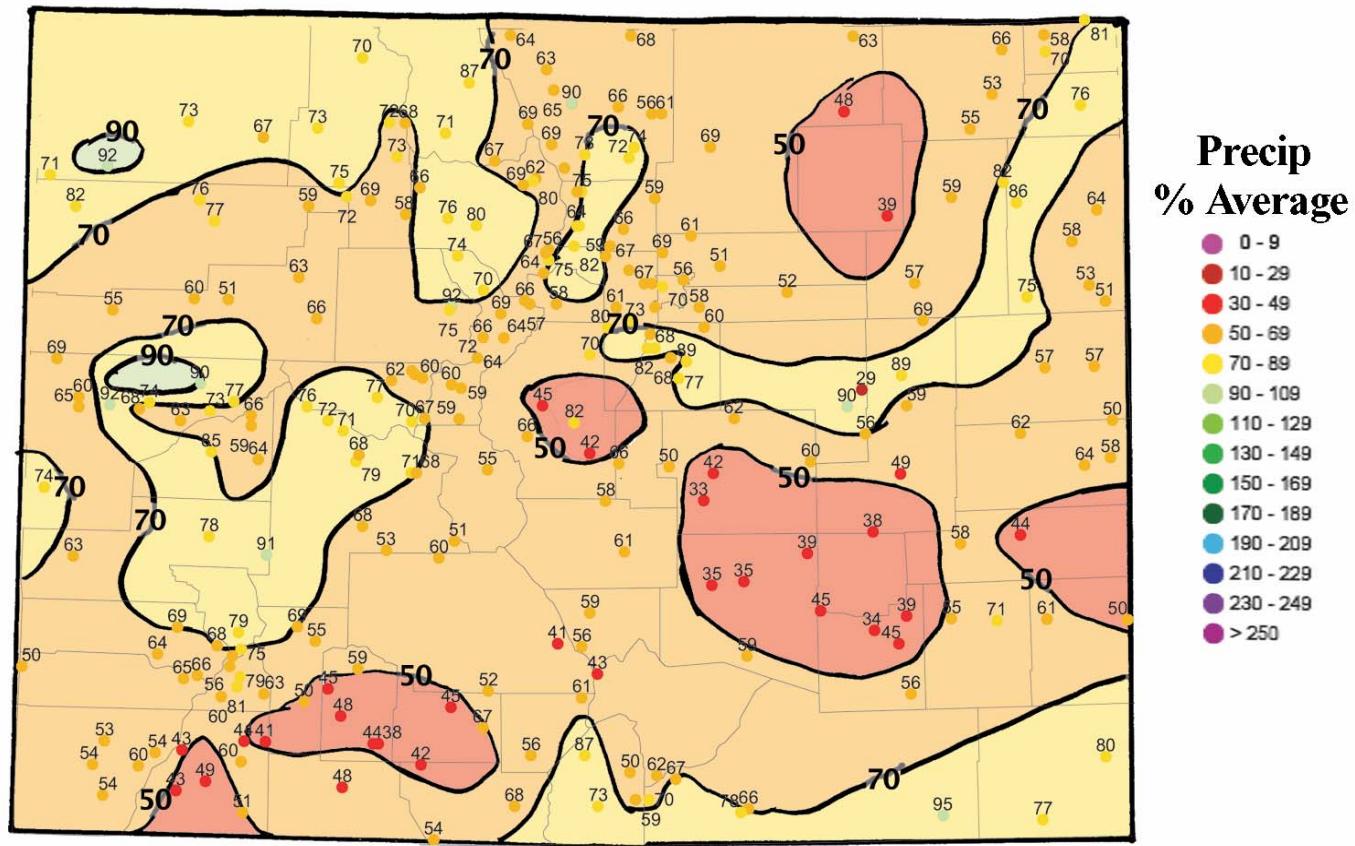
• Released Thursday, October 4, 2001 •

Author: Douglas Le Comte, NOAA/CPC

# 2002 Water Year Precipitation

Water Year 2002  
(Oct. 2001 - Sept. 2002)

Precipitation Percent of Average for 1961-1990 Averages

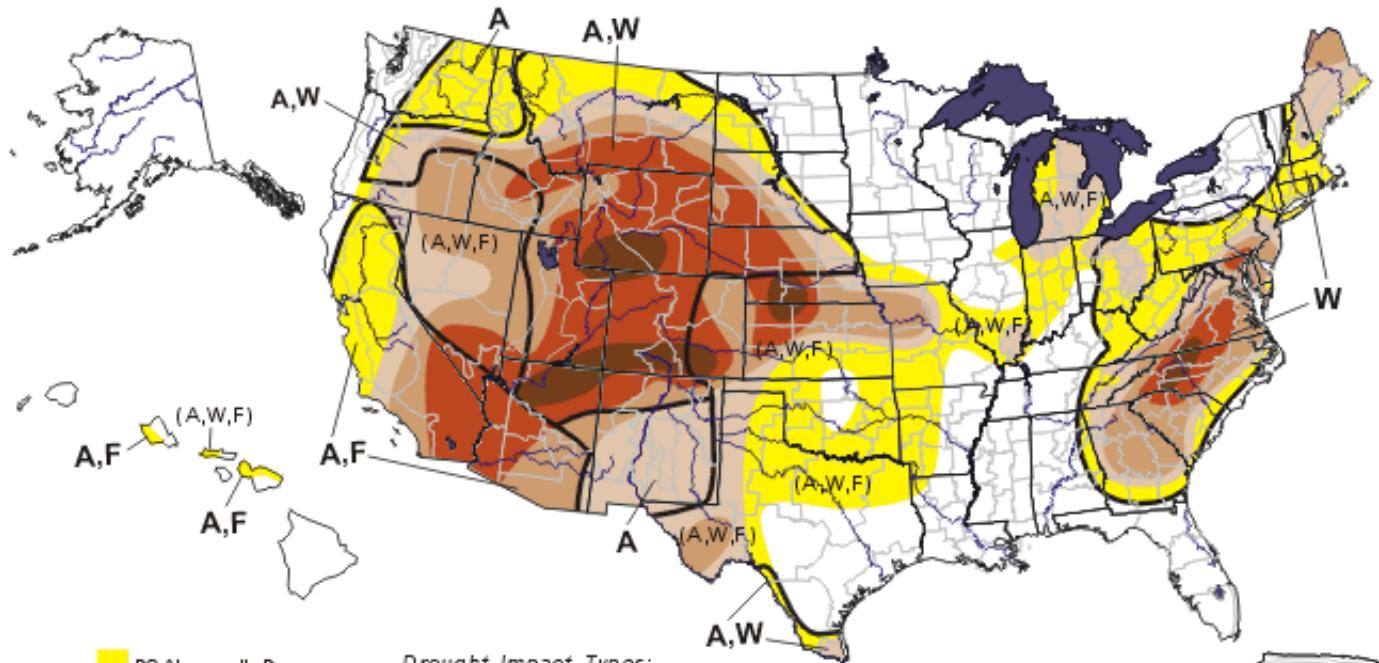


# October 2002 Drought Monitor Map

## U.S. Drought Monitor

October 1, 2002

Valid 8 a.m. EDT



- D0 Abnormally Dry
- D1 Drought—Moderate
- D2 Drought—Severe
- D3 Drought—Extreme
- D4 Drought—Exceptional

- Drought Impact Types:*
- A = Agriculture
  - W = Water (Hydrological)
  - F = Fire danger (Wildfires)
  - (No type = All 3 impacts)
- ✓ Delineates dominant impacts

The Drought Monitor focuses on broad-scale conditions.  
Local conditions may vary. See accompanying text summary  
for forecast statements.

<http://drought.unl.edu/dm>



Released Thursday, October 3, 2002

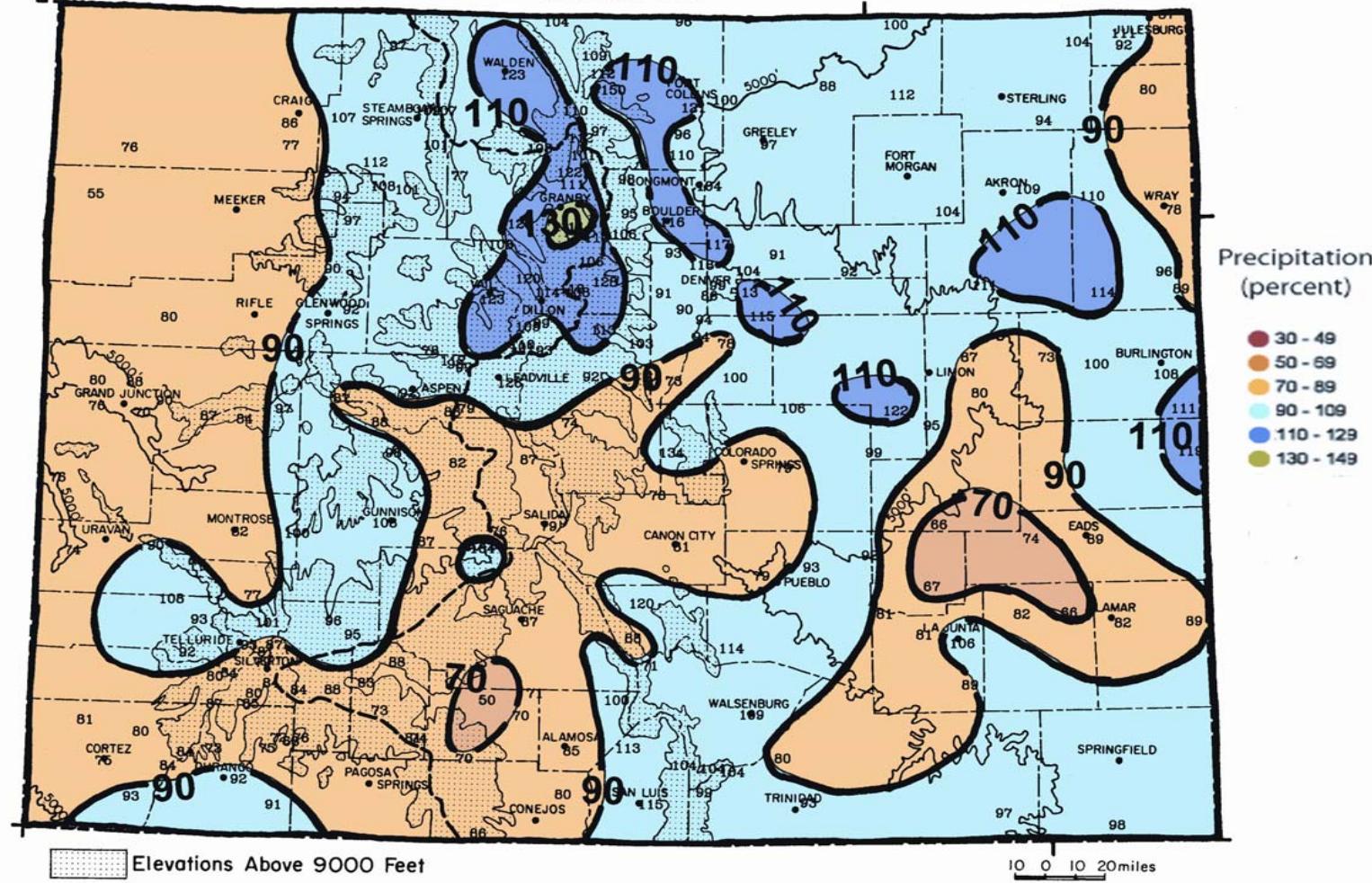
Author: Rich Tinker, CPC/NCEP/NWS/NOAA

# 2003 Water Year Precipitation

## Water Year 2003

October 2002 - September 2003 precipitation  
as a percent of the 1971-2000 average.

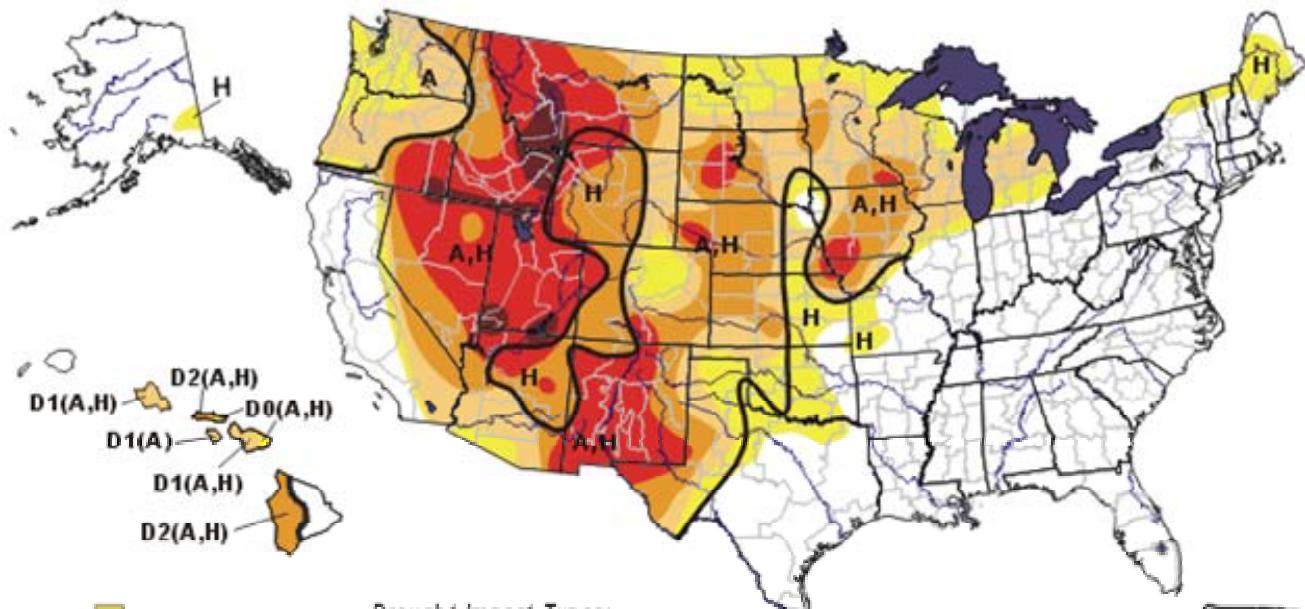
### COLORADO



# September 2003 Drought Monitor Map

## U.S. Drought Monitor

September 30, 2003  
Valid 8 a.m. EDT



- D0 Abnormally Dry
- D1 Drought—Moderate
- D2 Drought—Severe
- D3 Drought—Extreme
- D4 Drought—Exceptional

- Drought Impact Types:  
A= Agricultural (crops, pastures, grasslands)  
H= Hydrological (water)  
No type = both impacts  
✓ Delineates dominant impacts

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying texts summary for forecast statements.

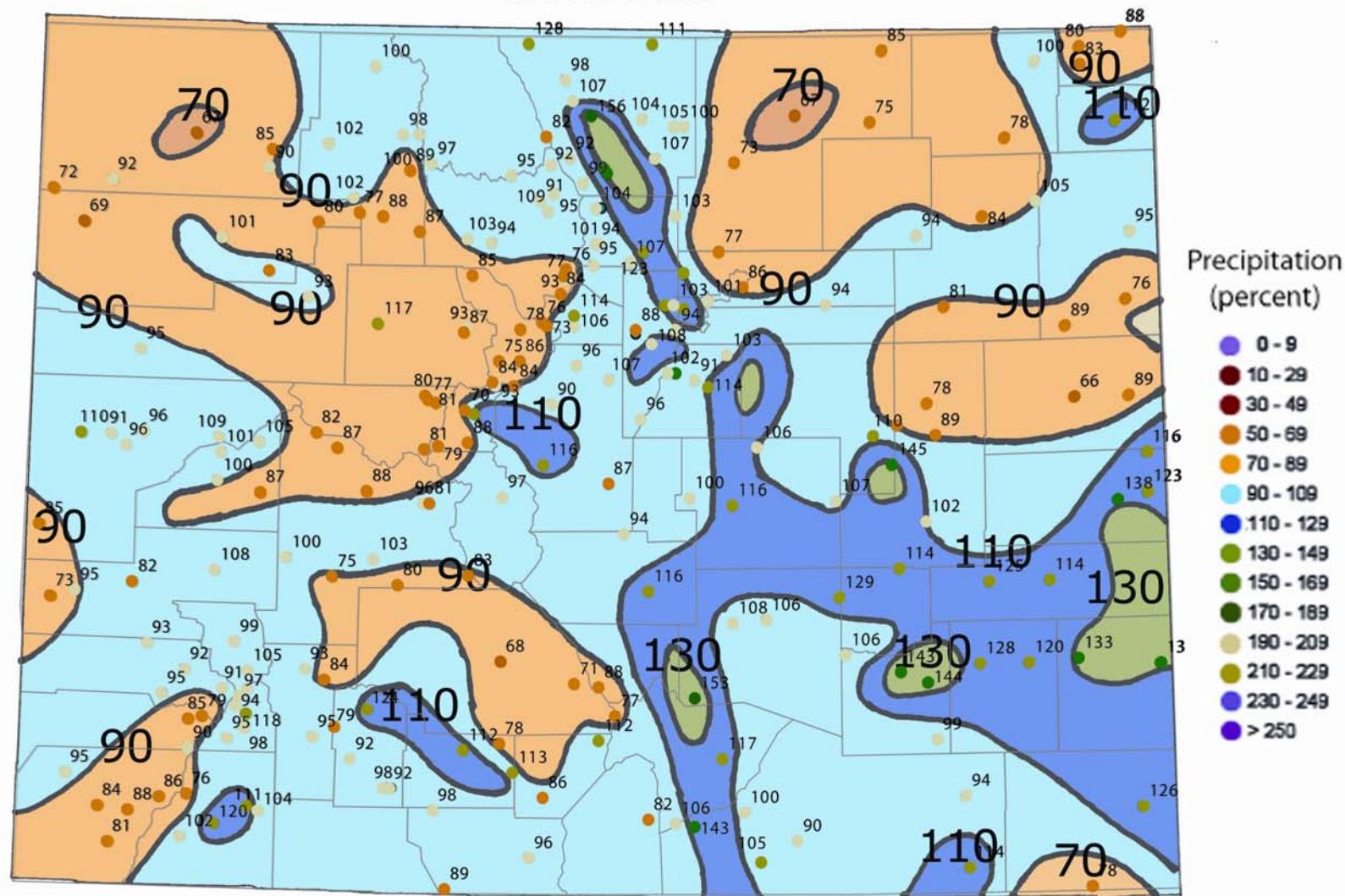
<http://drought.unl.edu/dm>



Released Thursday, October 2, 2003  
Author: Candace Tankersley/Scott Stephens, NOAA/NCDC

# 2004 Water Year Precipitation

## COLORADO

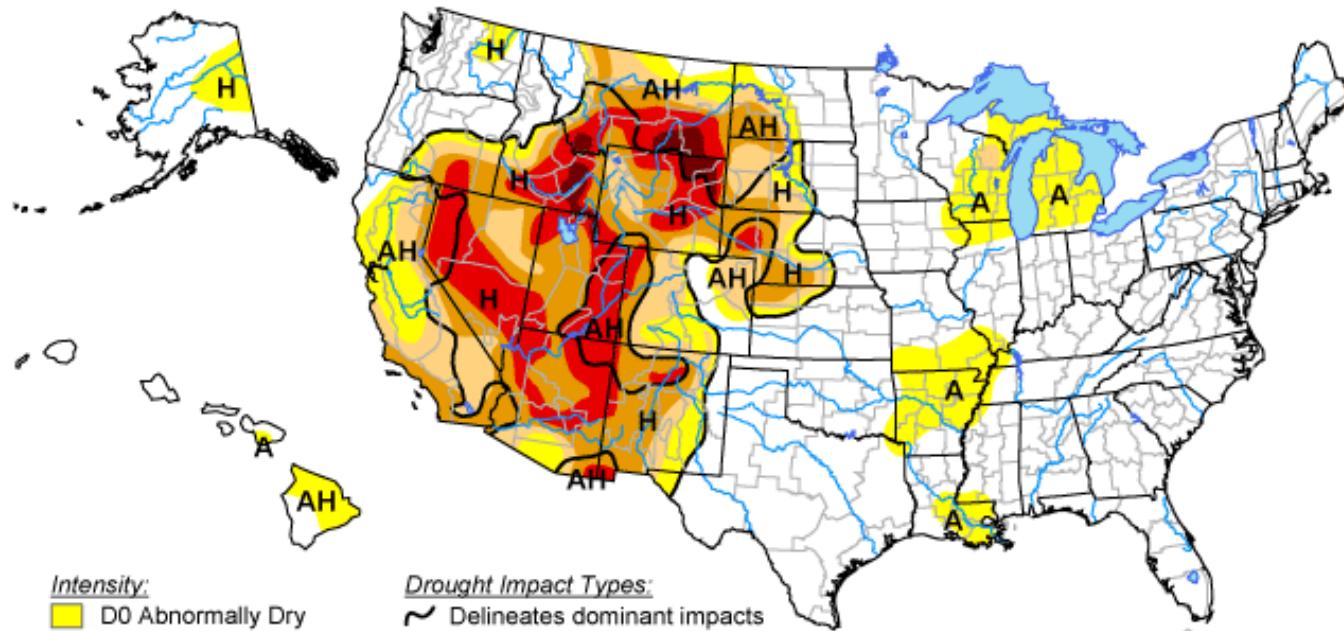


Water Year 2004 (October 2003 through September 2004) precipitation as a percent of the 1971-2000 average.

# September 2004 Drought Monitor Map

## U.S. Drought Monitor

September 28, 2004  
Valid 8 a.m. EDT



Intensity:

- Yellow = D0 Abnormally Dry
- Light Orange = D1 Drought - Moderate
- Dark Orange = D2 Drought - Severe
- Red = D3 Drought - Extreme
- Dark Red = D4 Drought - Exceptional

Drought Impact Types:

- ~ Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)
- (No type = Both impacts)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

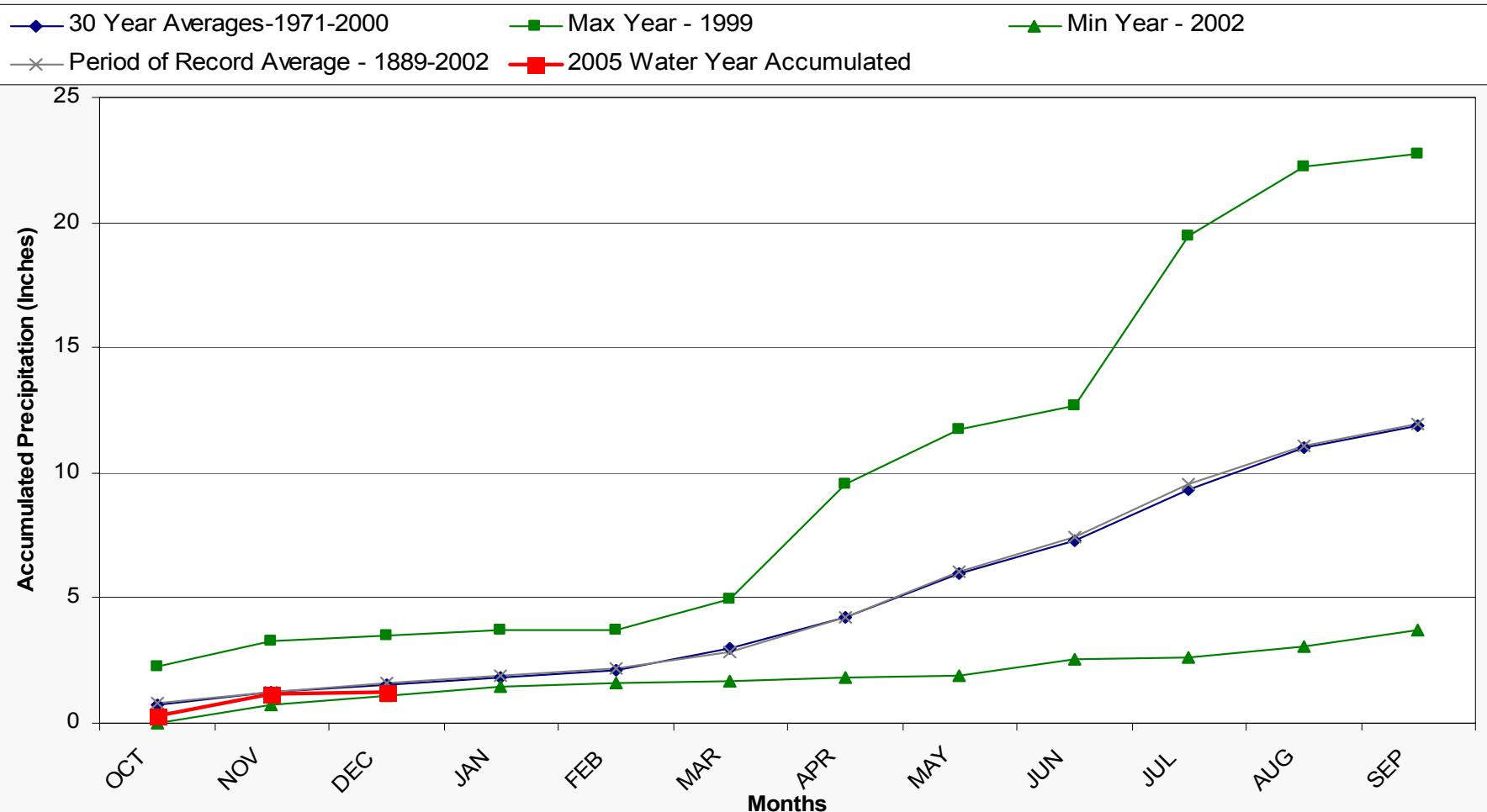
<http://drought.unl.edu/dm>



Released Thursday, September 30, 2004  
Author: Brad Rippey, U.S. Department of Agriculture

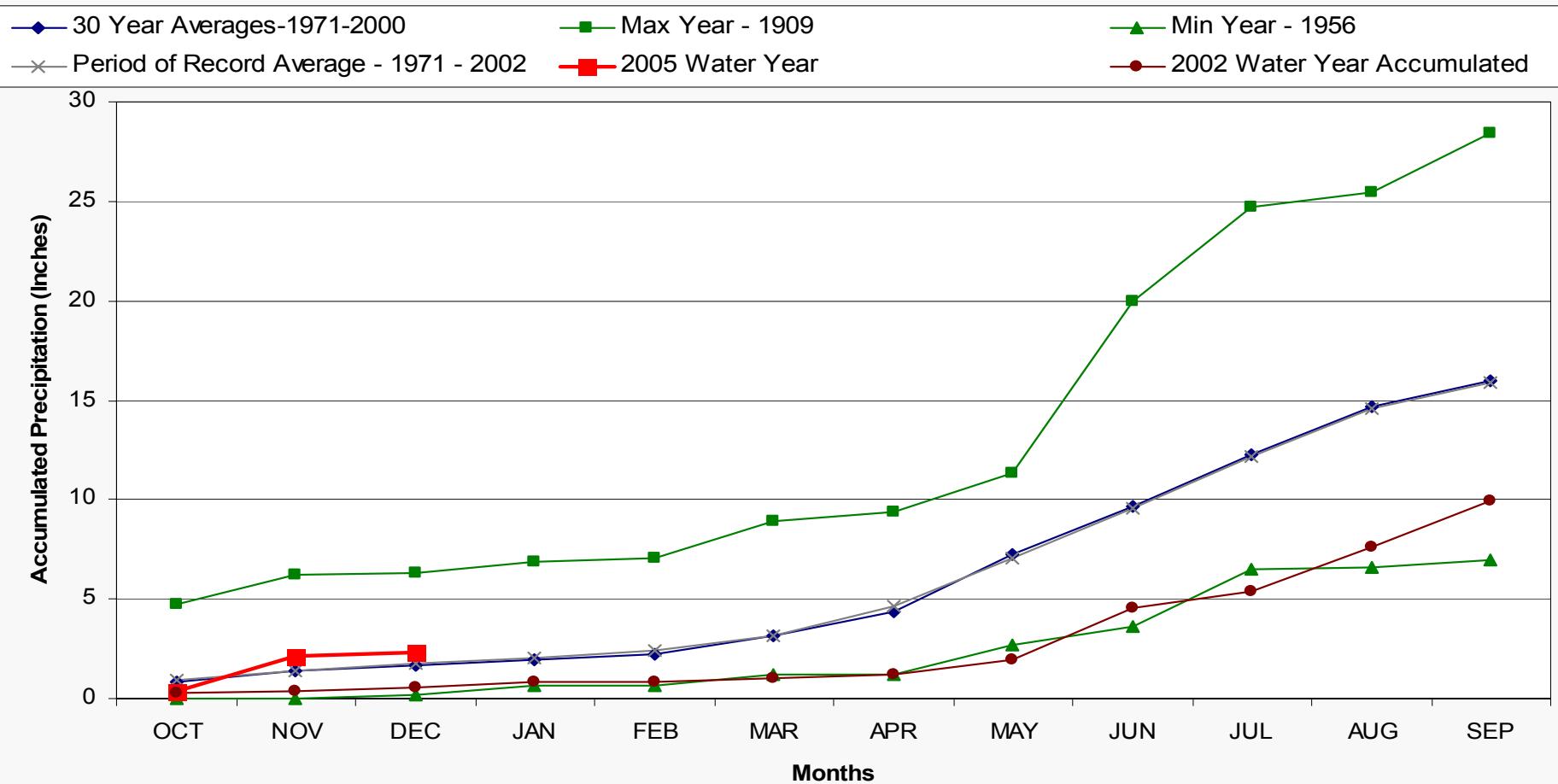
# Division 6 – Rocky Ford

## Rocky Ford 2005 Water Year (Oct '04 - Dec '04)



# Division 6 – Cheyenne Wells

## Cheyenne Wells 2005 Water Year (Oct '04 - Dec '04)



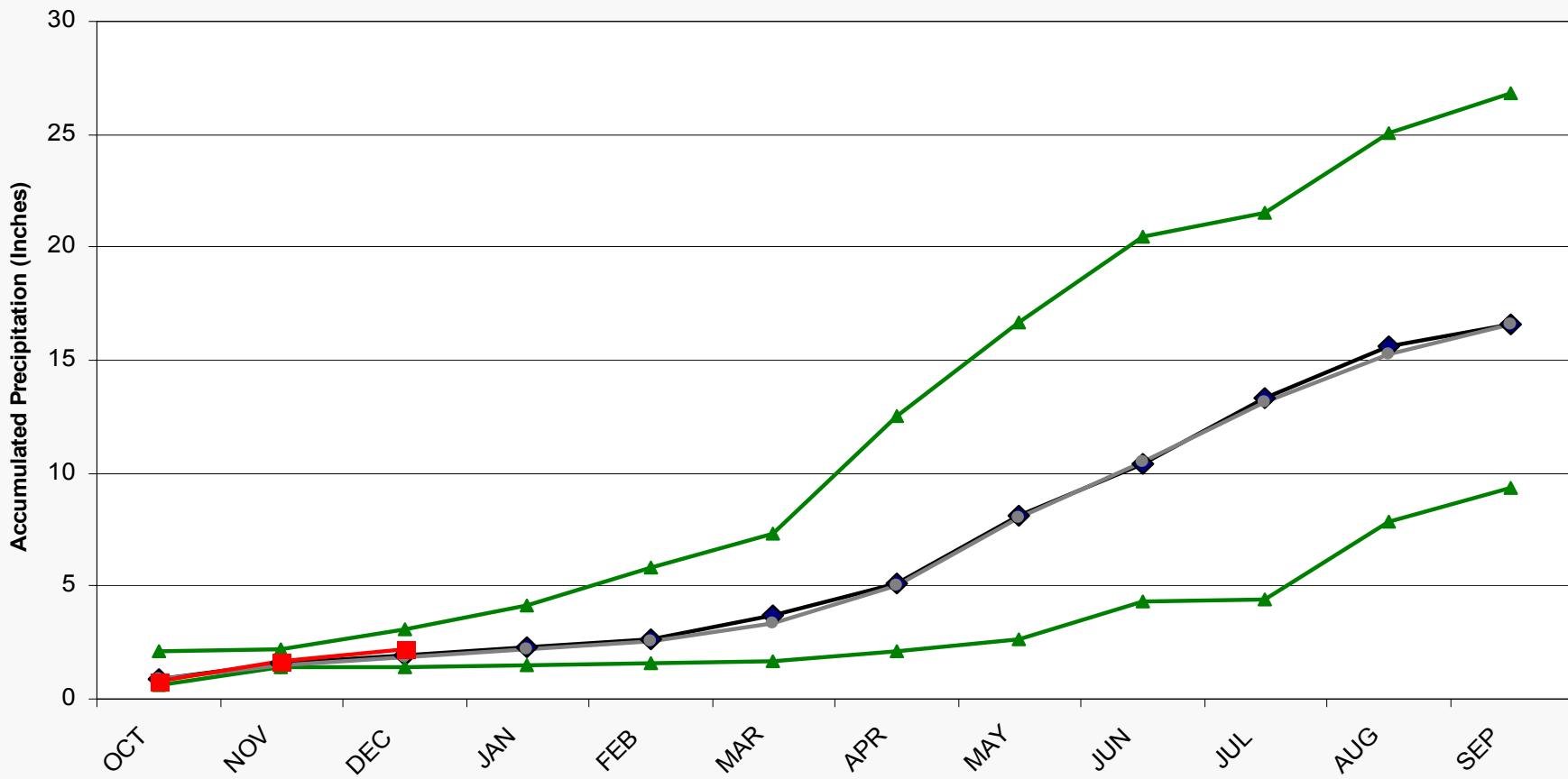
# Division 7 – Akron

## Akron 4E 2005 Water Year (Oct '04 - Dec '04)

—♦— 30 Year Averages-1971-2000  
—●— Period of Record Average - 1906 - 2002

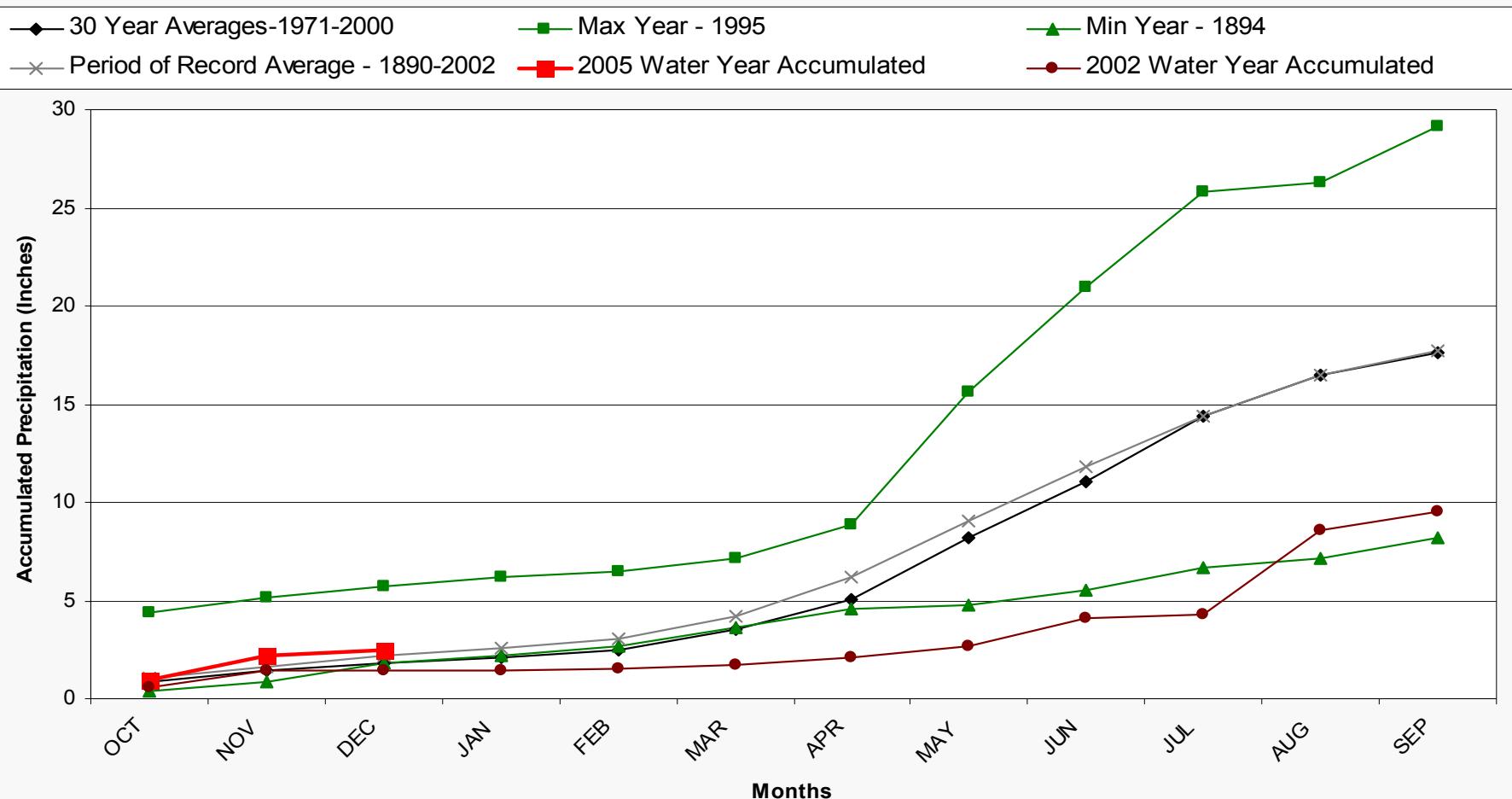
—▲— Max Year - 1915  
—■— 2005 Water Year Accumulated

—▲— Min Year - 2002

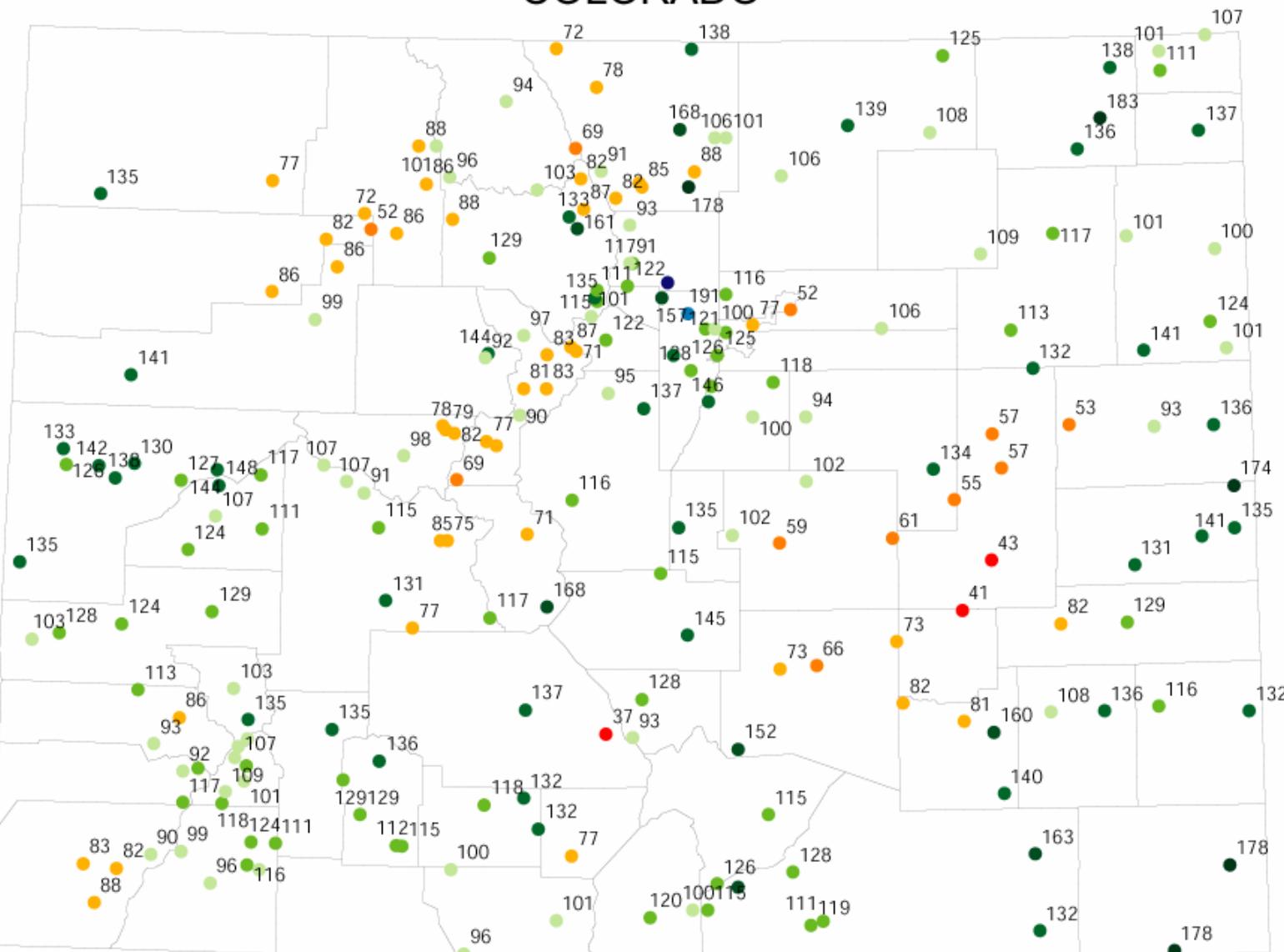


# Division 7 - Leroy

## Leroy 5SW 2005 Water Year (Oct '04 - Dec '04)



# COLORADO

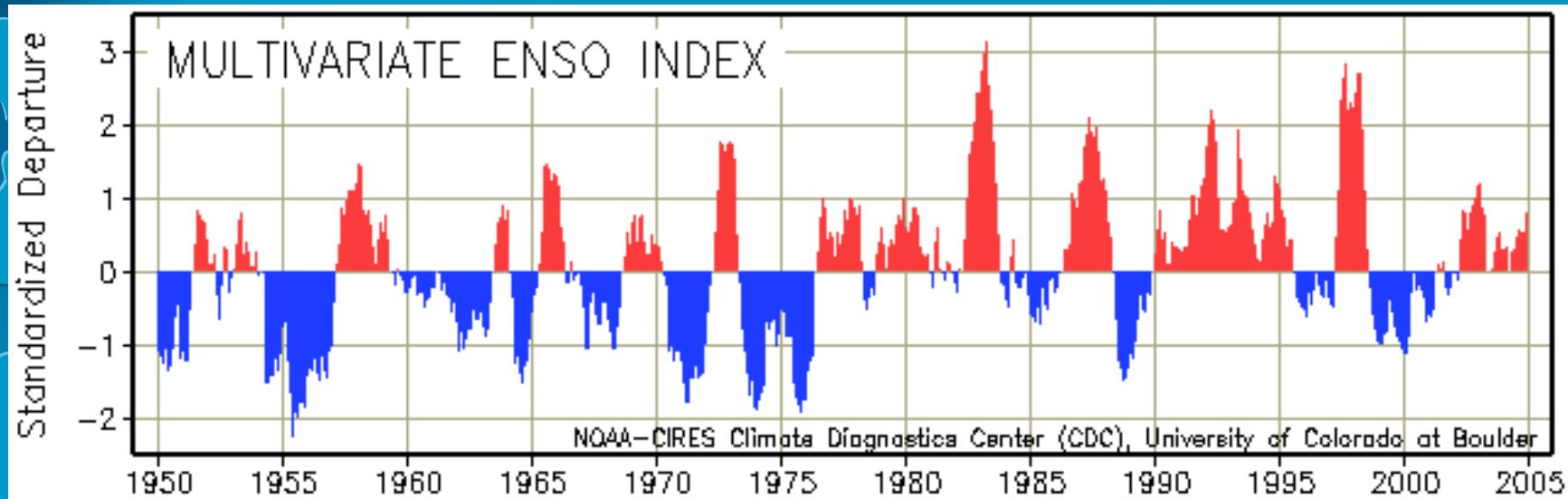


Water Year 2005 (October 2004 through December 2004) precipitation as a percent of the 1971-2000 average.

# What Comes Next?

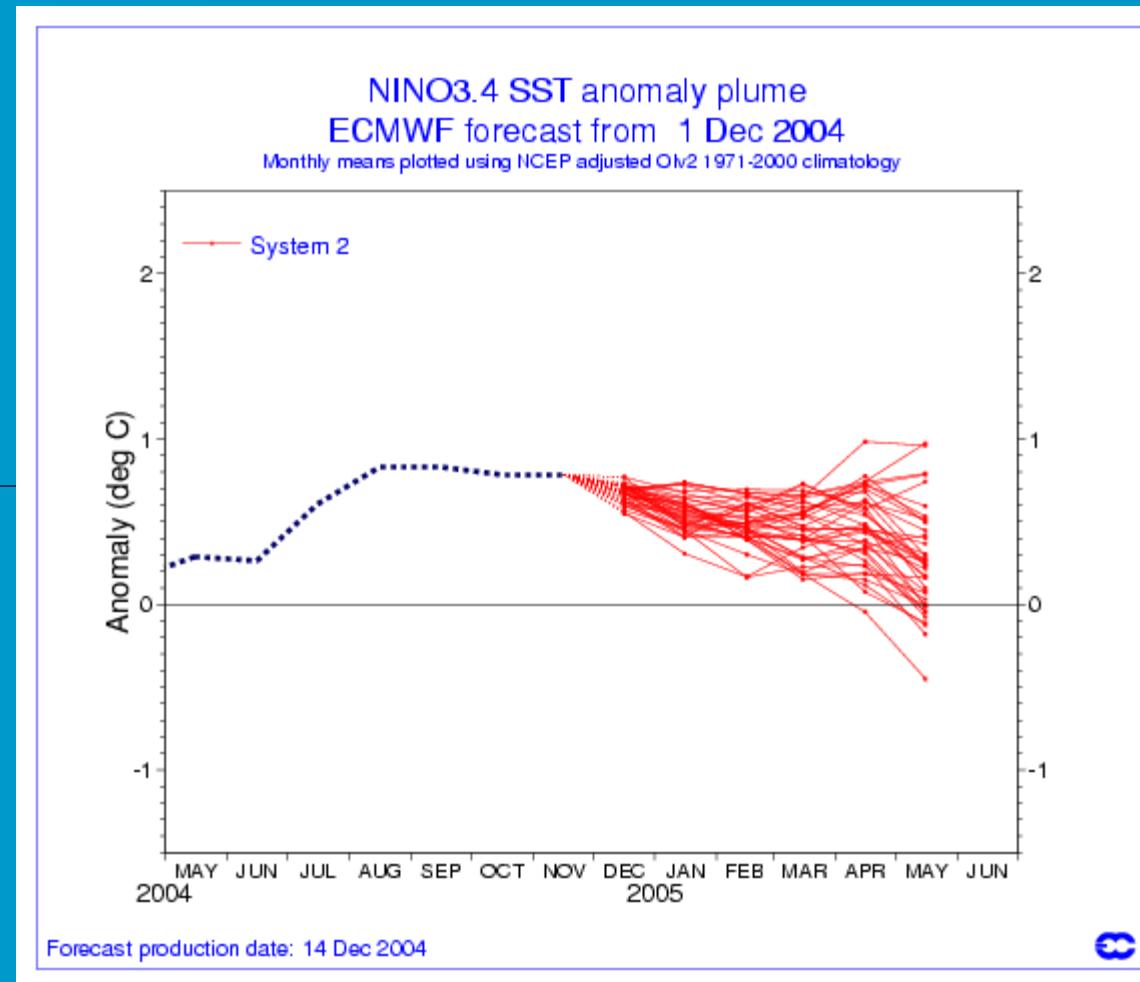


# Multivariate ENSO Index (MEI)

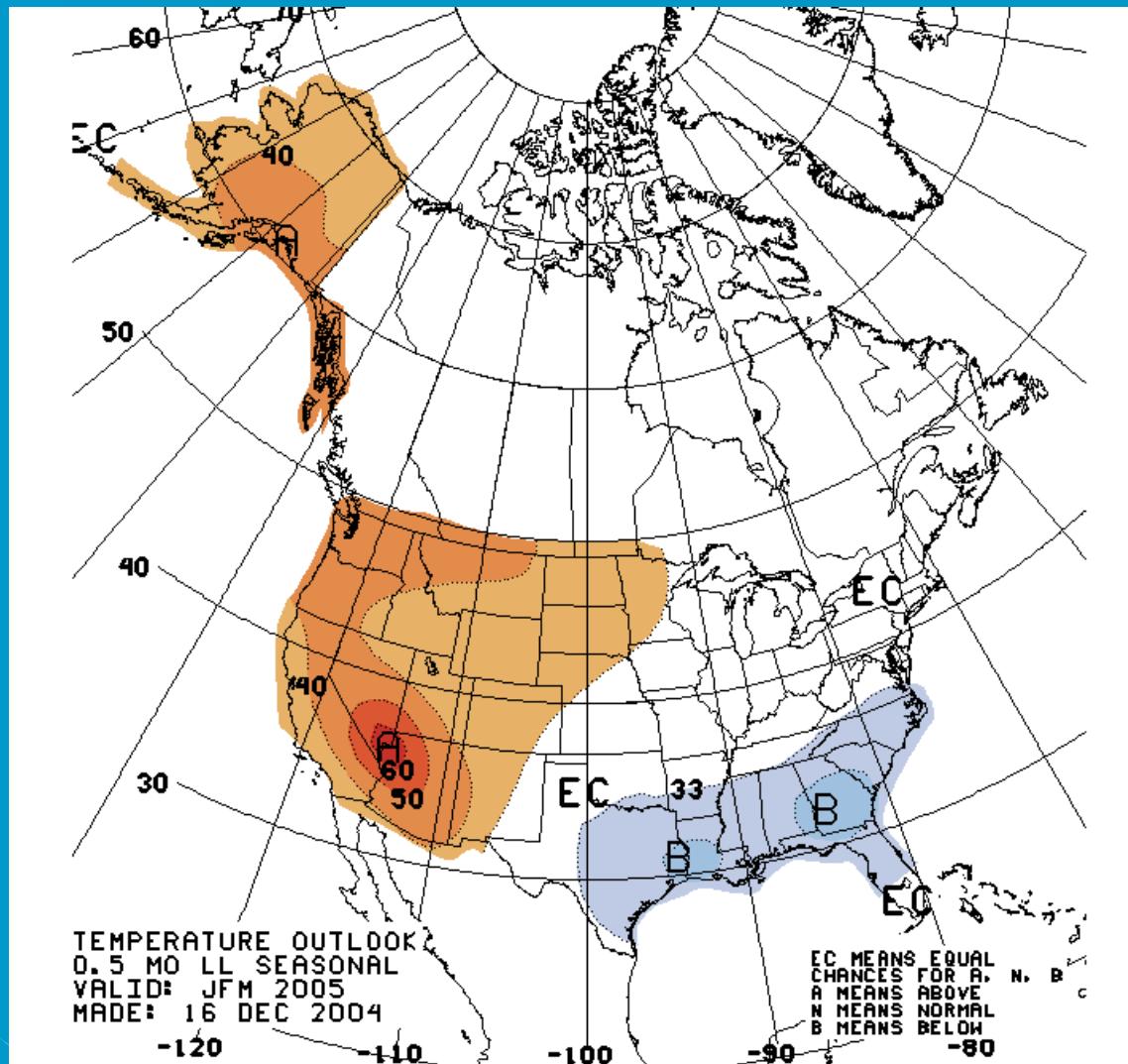


Last update: January 7, 2005

# El Nino Forecast



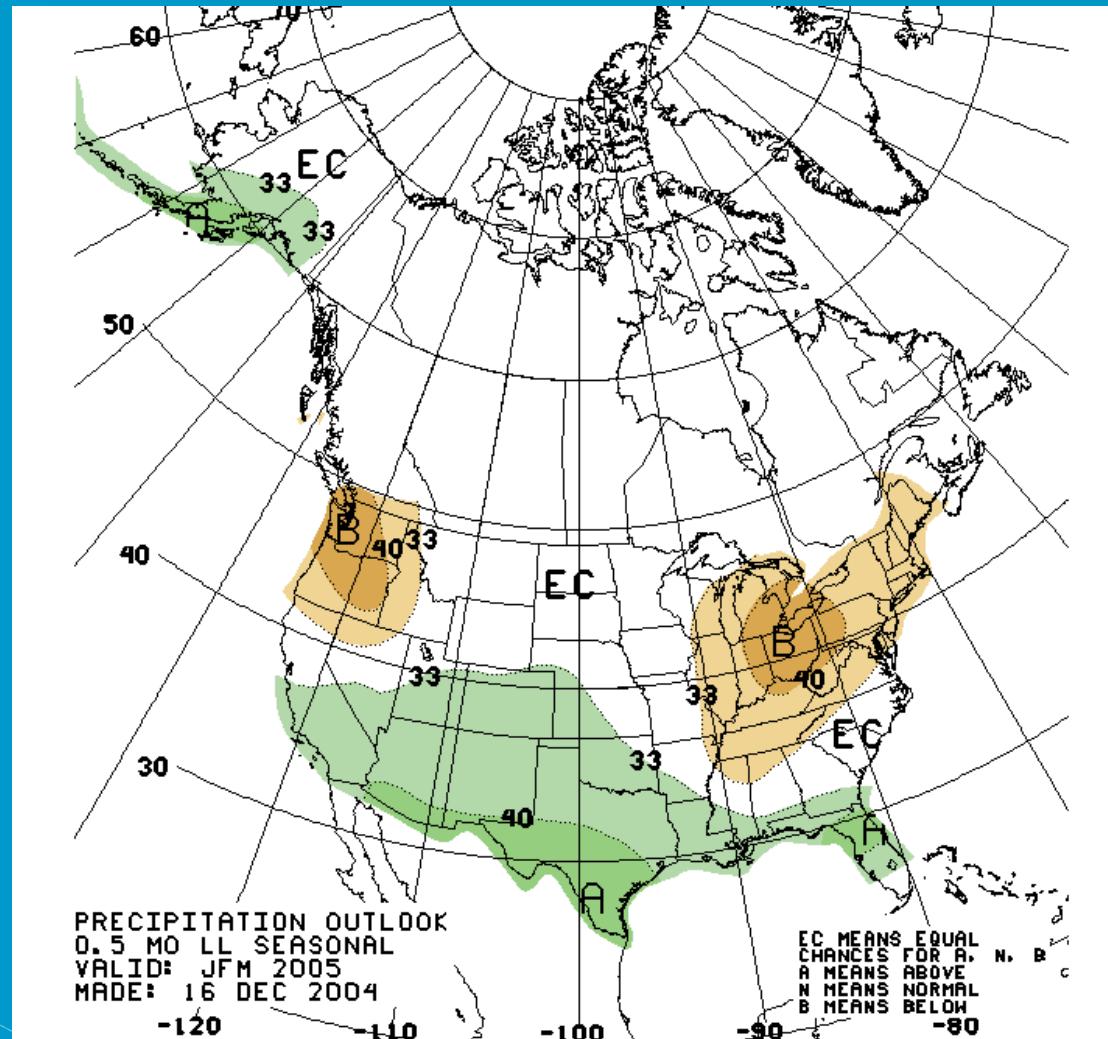
# Temperature Jan-Mar 2005



From the Colorado Prediction Center

[http://www.cpc.ncep.noaa.gov/products/predictions/multi\\_season/13\\_seasonal\\_outlooks/color/churchill.html](http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html)

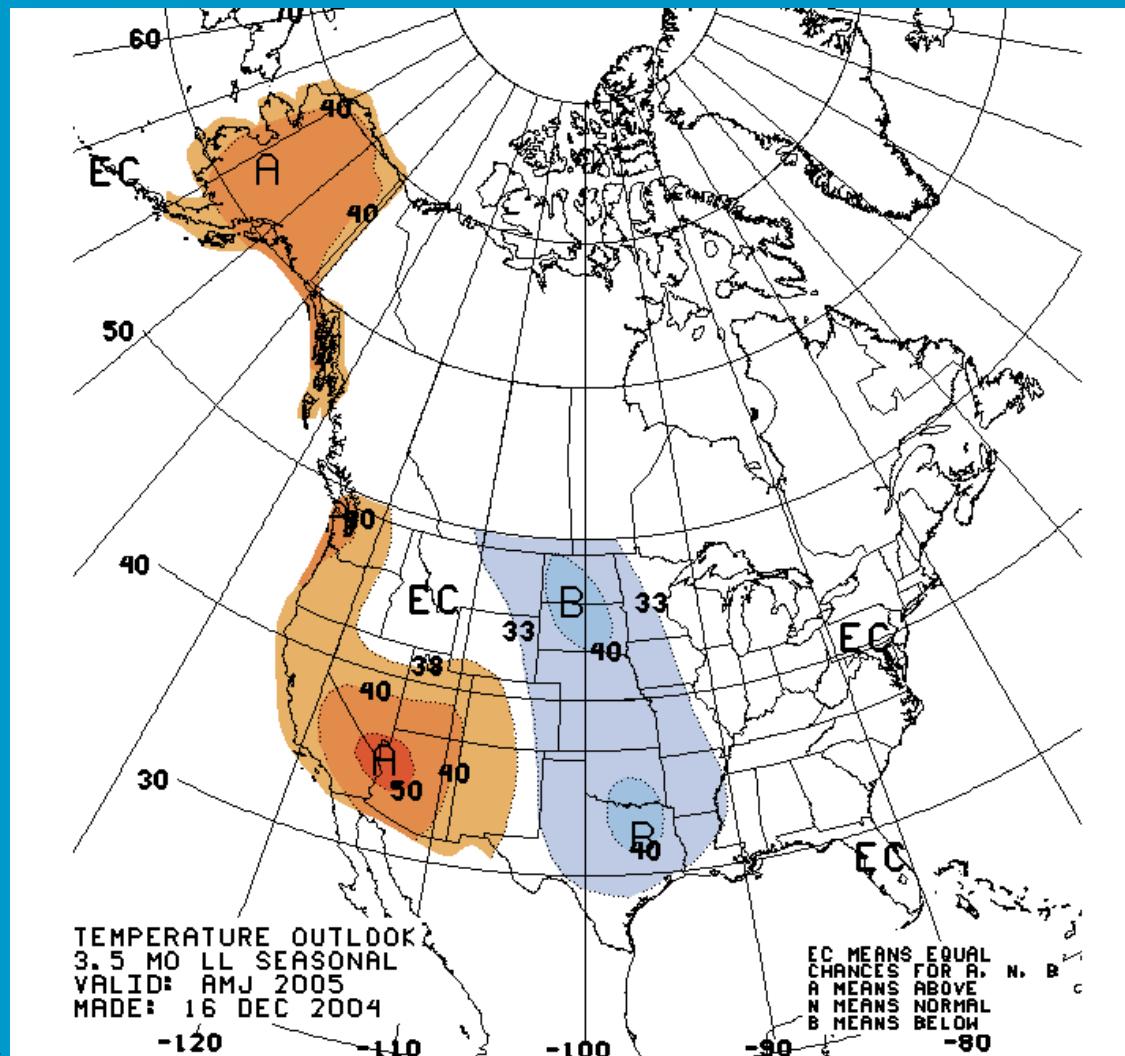
# Precipitation Jan-Mar 2005



From the Colorado Prediction Center

[http://www.cpc.ncep.noaa.gov/products/predictions/multi\\_season/13\\_seasonal\\_outlooks/color/churchill.html](http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html)

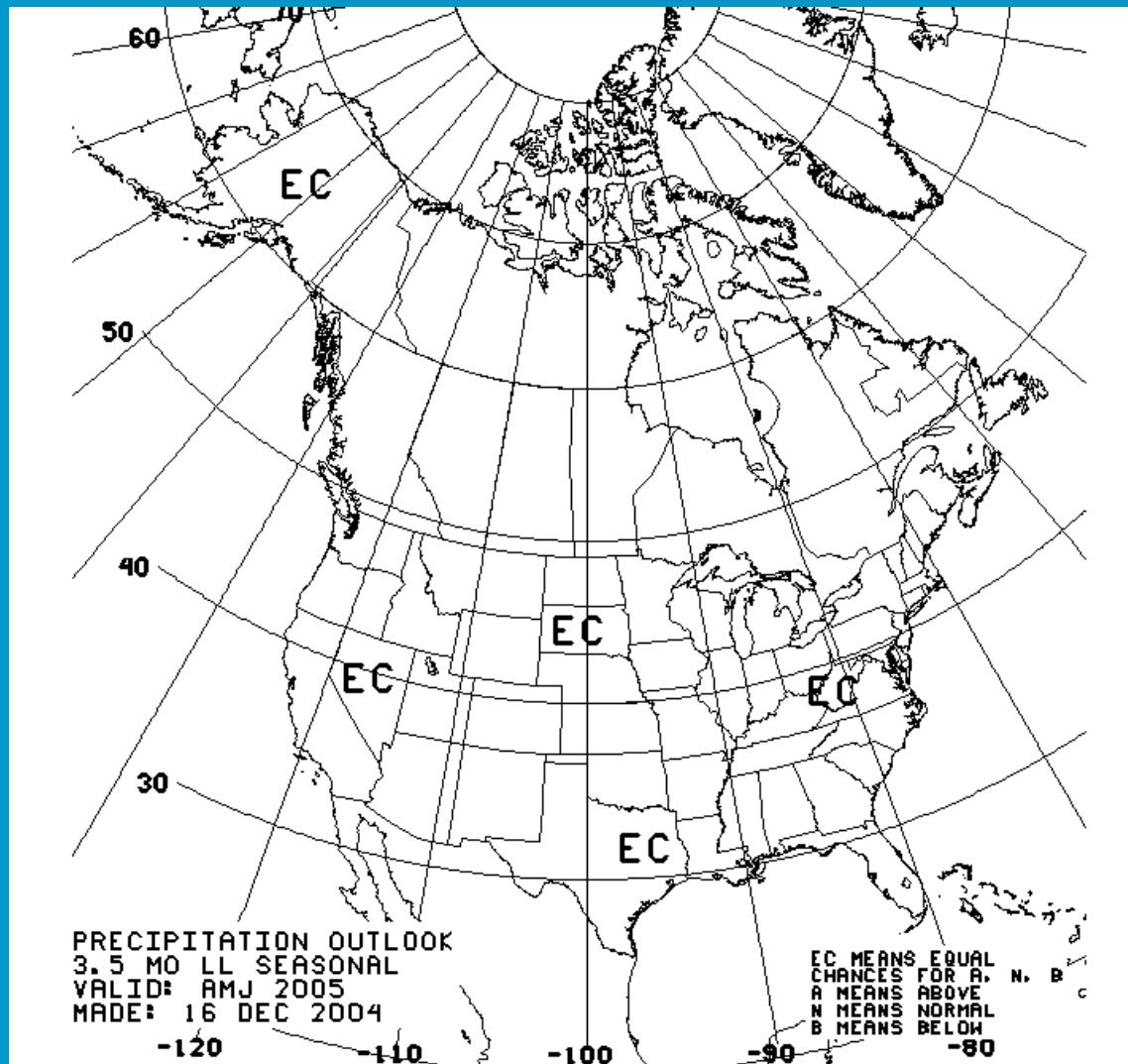
# Temperature Apr-Jun 2005



From the Colorado Prediction Center

[http://www.cpc.ncep.noaa.gov/products/predictions/multi\\_season/13\\_seasonal\\_outlooks/color/churchill.html](http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html)

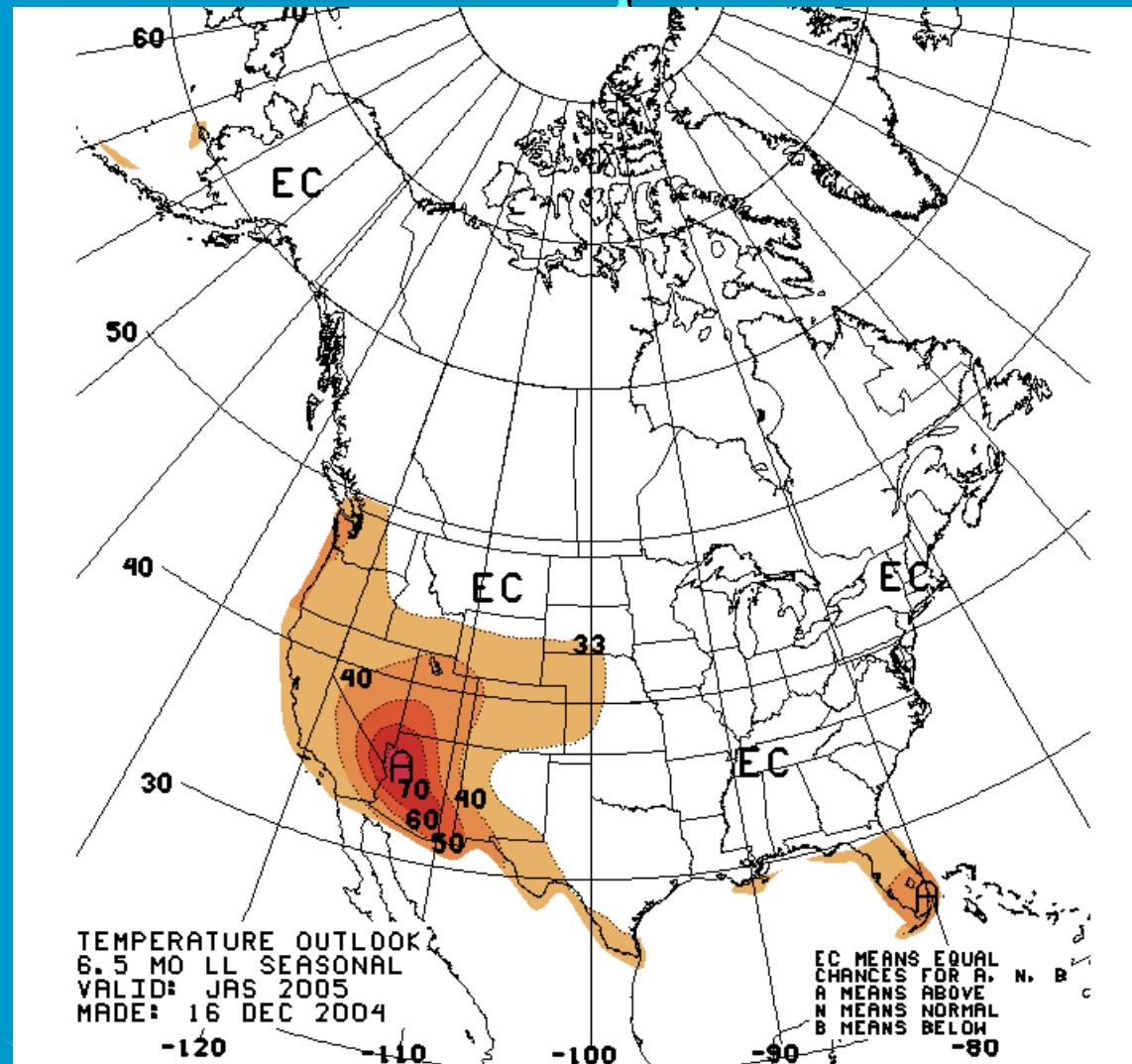
# Precipitation Apr-Jun 2005



From the Colorado Prediction Center

[http://www.cpc.ncep.noaa.gov/products/predictions/multi\\_season/13\\_seasonal\\_outlooks/color/churchill.html](http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html)

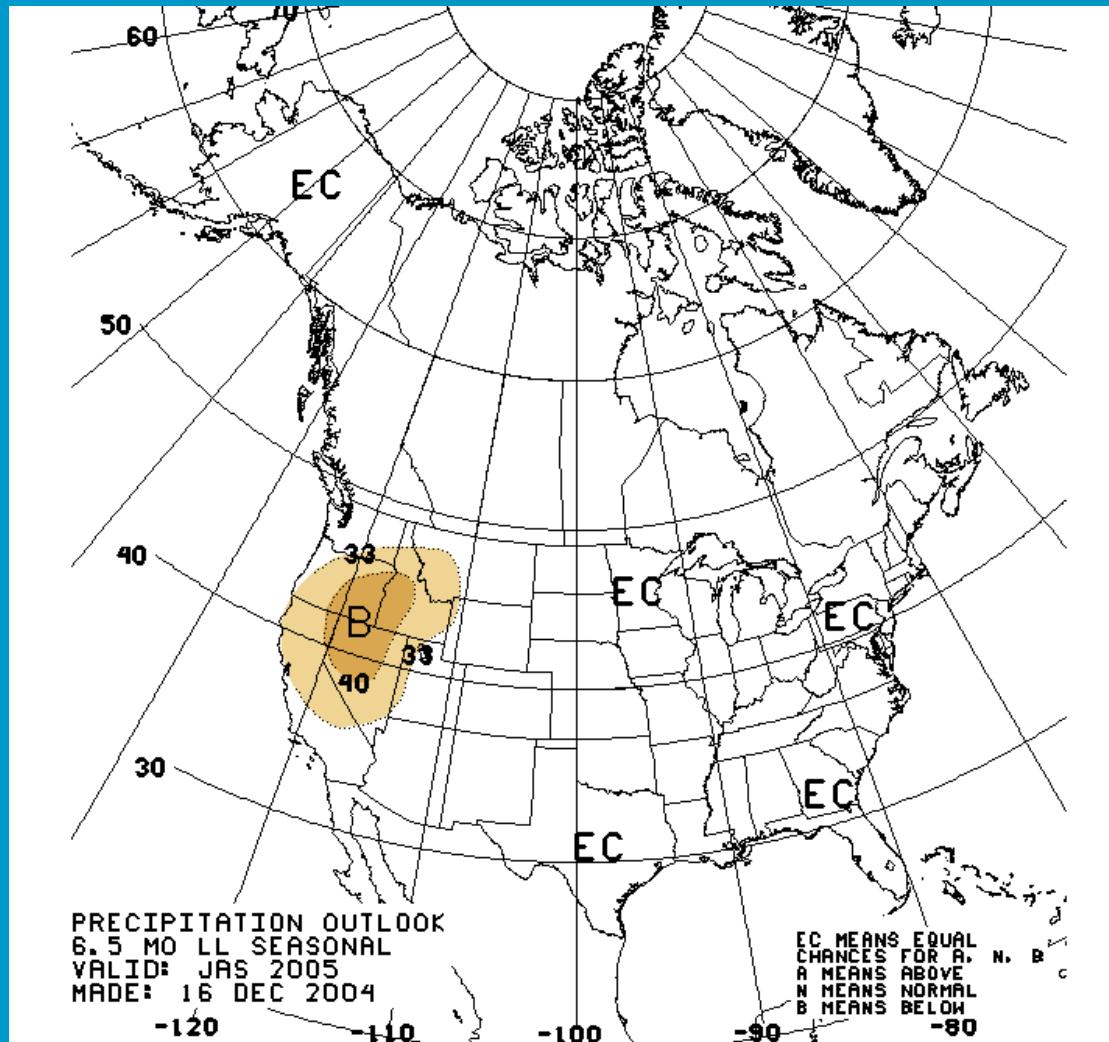
# Temperature Jul-Sep 2005



From the Colorado Prediction Center

[http://www.cpc.ncep.noaa.gov/products/predictions/multi\\_season/13\\_seasonal\\_outlooks/color/churchill.html](http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html)

# Precipitation Jul-Sep 2005



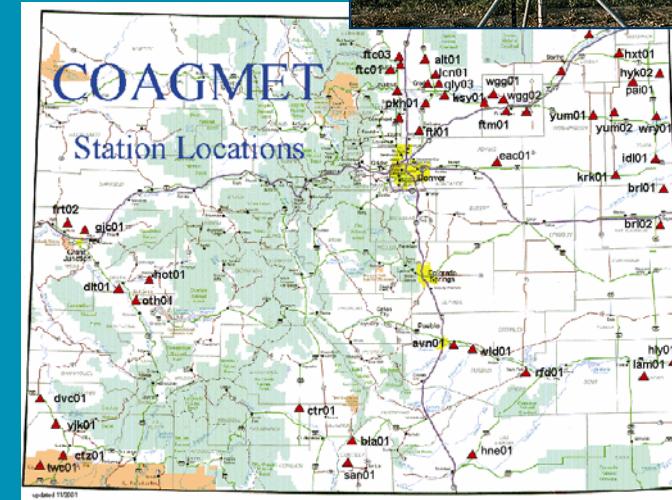
From the Colorado Prediction Center

[http://www.cpc.ncep.noaa.gov/products/predictions/multi\\_season/13\\_seasonal\\_outlooks/color/churchill.html](http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html)

# CoAgMet

## Weather Data for Agriculture

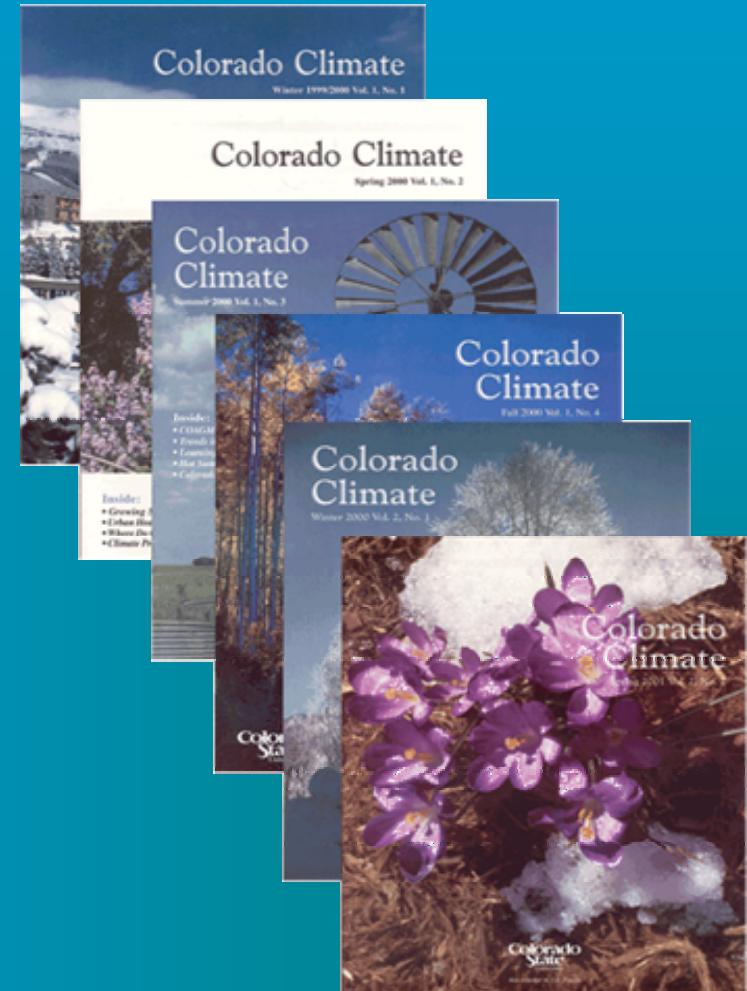
- *Automated weather stations  
with daily and hourly readings  
of:*
  - Temperature
  - Humidity
  - Wind
  - Precipitation
  - Solar energy
  - Evapotranspiration



<http://www.coagmet.com>

# Colorado Climate Magazine

- *Good bedtime reading about the climate of Colorado -- recent and historic*
- *\$15/year subscription pays printing and mailing costs*



<http://ccc.atmos.colostate.edu/magazine.php>

# CoCoRaHS

Community Collaborative Rain, Hail, and Snow Network



<http://www.cocorahs.org>

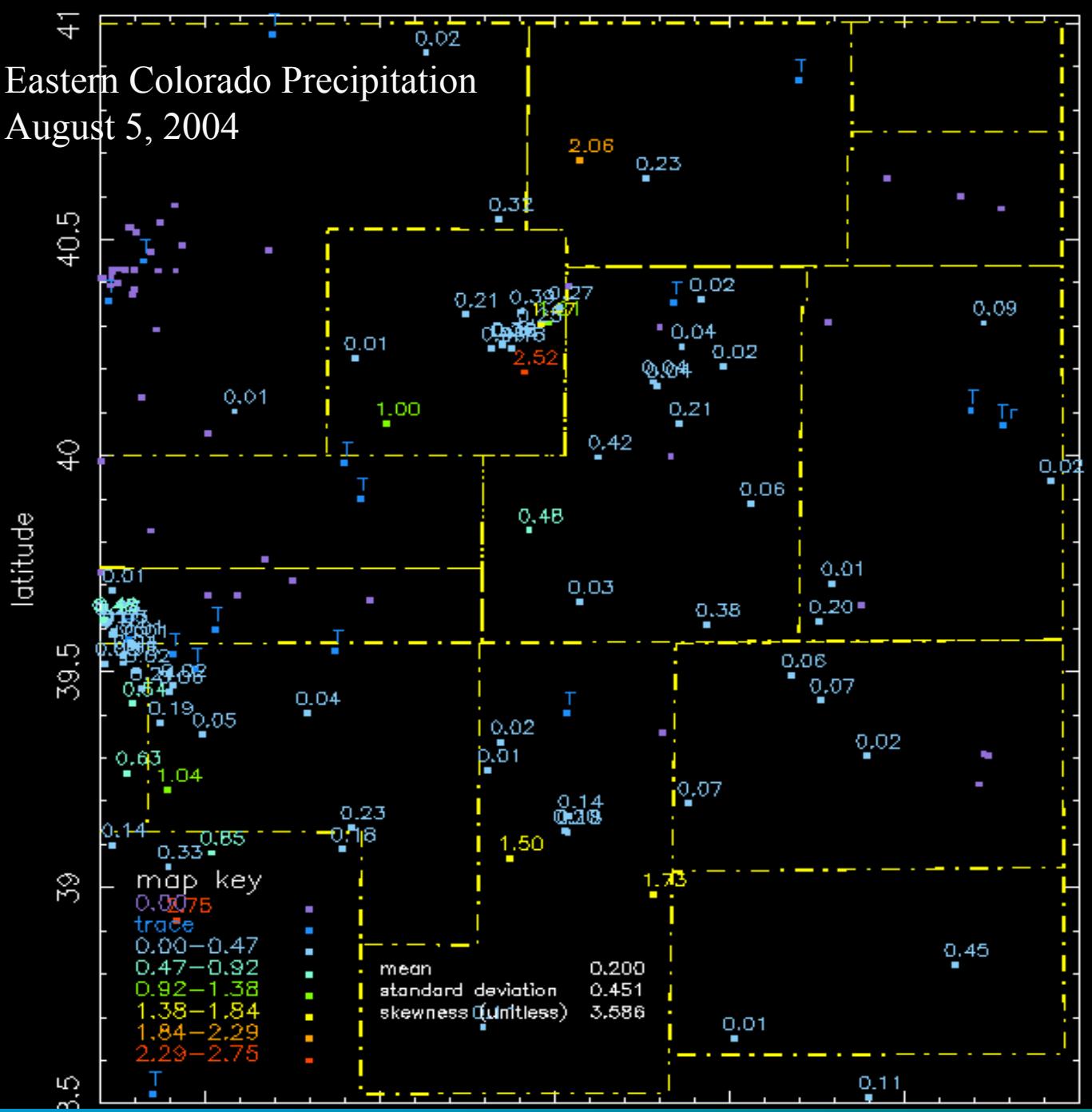
- Over 1,000 volunteers participate in rain, hail and snow measurements.
- More accurate maps, verifies forecasting, radar research, crop damage, drought/flooding, educational purposes.



Support for this project provided by Informal Science Education Program, National Science Foundation and many local charter sponsors.

# Eastern Colorado Precipitation

## August 5, 2004



# Colorado Climate Center

## Colorado State University

- *Data and Power Point Presentations available for downloading*
- <http://ccc.atmos.colostate.edu>  
*click on “Drought”  
then click on “Presentations”*

